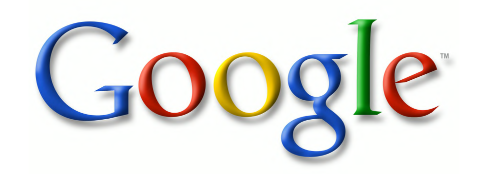
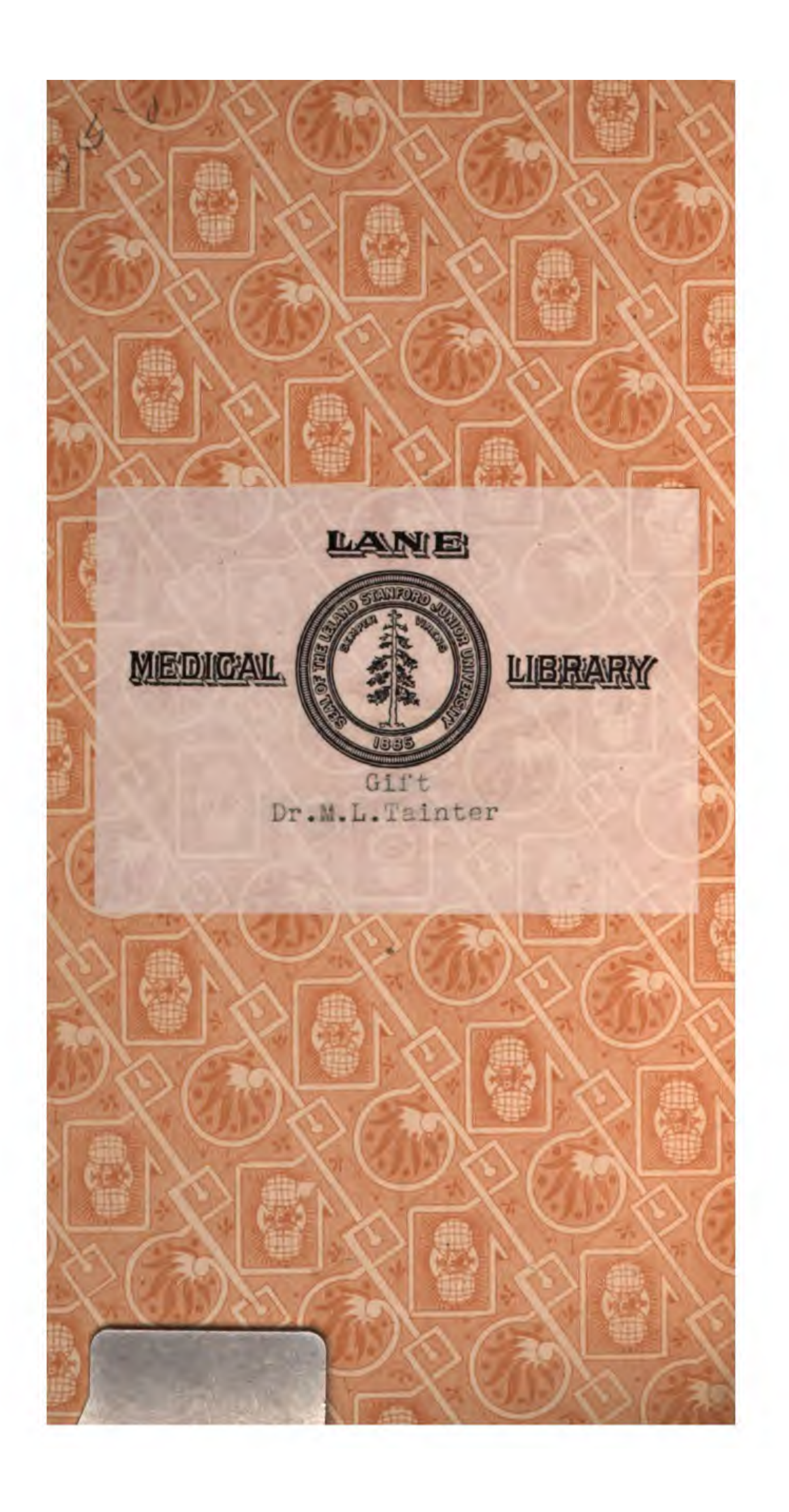





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A PRACTICAL TREATISE

ON

Materia Medica and Therapeutics

WITH ESPECIAL REFERENCE TO THE CLINICAL APPLICATION OF DRUGS.

BY

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SECOND EDITION. THOROUGHLY REVISED.

IN TWO VOLUMES.

VOLUME II.

An Independent Volume upon Drugs.



PHILADELPHIA AND LONDON:
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TO

THE MANY PUPILS

WHO HAVE ATTENDED HIS LECTURES DURING THE PAST
EIGHTEEN YEARS AND ARE NOW PURSUING THEIR
PROFESSION IN THE UNITED STATES OF AMERICA
AND IN MANY FOREIGN COUNTRIES,

THIS VOLUME,

ILLUSTRATING AN ALL-IMPORTANT AND PRACTICAL
DEPARTMENT OF MEDICINE, PHARMACY,
AND DENTISTRY,

IS

RESPECTFULLY INSCRIBED BY THEIR TEACHER,

THE AUTHOR.

PREFACE TO FIRST EDITION

VOLUME II.

The issue of the second volume of this work has been unexpectedly and unavoidably delayed. Several circumstances have concurred to produce this result. In projecting a work of some magnitude it is necessarily difficult to estimate the time which its execution will demand. After the most liberal allowance seems to have been made, the exigencies of professional life may totally disarrange preconceived plans. This premise, which applies to every physician who essays to add to the literature of his profession, gains added force in the present instance, since the author stood already pledged to several other literary undertakings. No one can regret more than the writer that his calculations have been disturbed and the fulfillment of his present task postponed. He felt, however, that it was far more important that his labor should be performed as thoroughly as possible than that it should be finished by a specified date. He certainly desired that the work should be based upon his own experience and convictions. Yet no less assuredly was he anxious to modify or extend his conclusions in the light of those reached by other laborers in the same field. It was his aim to render this volume a complete, as well as practical, exposition of the pharmacological, physiological, and therapeutical action of the various drugs now used in medicine. Practical usefulness determines the standard of value of a work on therapeutics. It should aim to be a complete repertory of the various means at our command for resisting the ravages or removing the effects of disease. It should fairly represent the various measures which have been found beneficial in the experience of the general profession. Though a writer may speak with conviction of remedies and methods which, in his own experience, have proved of advantage, he should not lose sight of the fact that, for one reason or another, the practitioner is not infrequently disappointed in the action of the most approved medicaments. Cases constantly occur, especially in the course of chronic affections, in which our knowledge of drugs and methods of administration is tried to the utmost extent. One seemingly indicated remedy after another is, in vain, employed. It is well, therefore, that, as far as possible, all the applications of each drug should

be mentioned, specifying those which are most important and constant, and pointing out those which may be of service only upon exceptional occasions. Impressed with this idea, the author has also introduced into this volume a brief consideration of many substances not actually in general or frequent use by the profession. Many are new, and some of these appear to be very valuable additions to the materia medica. A few are old remedies, which have fallen into undeserved neglect. The writer has also endeavored to bring his description of drugs and their applications fully up to the date of publication. He consequently believes that much information is gathered in these pages which has hitherto been scattered through domestic and foreign journals, and often practically inaccessible in the hour of need. A succinct account has been given of the latest contribution of experimental medicine to therapy,—tuberculin, or Koch's lymph. That this is a fluid of decided energy has been abundantly attested. Whatever be its fate as a remedy, the writer, with as little desire as ability to forecast the future, yet feels himself warranted in looking upon tuberculin as a significant index of the future treatment of infectious disease. The finger of science points steadily in one direction. The more that is known of the life-history of bacteria and their relations to disease, the more apparent it becomes that infection resembles an intoxication,—a poisoning by chemical compounds of definite, albeit unstable, chemical composition. Protective inoculation but substitutes a mild for a virulent attack. Established infection must be neutralized by bacterial products. Therefore, whether or not Koch's fluid prove of permanent worth, its discovery nevertheless marks a stage in that progress which had already been inaugurated by Pasteur.

The author wishes, in conclusion, to express appreciation and thanks to his colleagues, Professors J. Foster Flagg, James E. Garretson, H. Ernest Laplace, Peter D. Keyser, William F. Waugh, Henry I. Dorr, Samuel B. Howell, William H. Pancoast, and Dr. E. L. B. Godfrey, for therapeutical suggestions which have been included in the text of the work, credit being given to the opinions referred to in each case.

During the time that this work has been passing through the press, the author has received much valuable assistance and very many practical suggestions from his colleague, Prof. Frank Woodbury, to whom he is most grateful. The writer is likewise indebted to Dr. George Hewitt for much assistance, especially in proof-reading and for the indexes, which he has most carefully prepared.

PHILADELPHIA, 1519 WALNUT STREET, April 1, 1891.

PREFACE TO SECOND EDITION

VOLUME II.

A SECOND edition of this work being demanded, the author has taken the opportunity to make some additions and alterations representing the clinical investigations relative to certain remedies which have been recently introduced. Brief accounts have been given of trichloracetic acid, cantharidate of potassium, euphorin, europhen, phenocoll, piperazin, benzo-naphthol, losophan, methylene blue, chloralose, salophen, strontium, thallin, and other substances. The clinical applications of antipyrin and the physiological and therapeutical action of cactus have received fuller attention. The use of caryophyllus in tuberculosis and the physiological properties of catha and cetrarin have also been noted. A more extended account, in accordance with additional experience, has been given of chloralamid. The section upon tuberculin has been revised to correspond with the experience of the past eighteen months, and a brief mention has been made of tuberculocidin. The use of animal extracts and juices has also been mentioned, especially the treatment of myxœdema by means of an extract of the thyroid gland.

The writer takes advantage of this occasion to thank his critics, some of whose suggestions, it will be seen, have been adopted in this edition.

PHILADELPHIA, 1519 WALNUT STREET,
April 1, 1893.

PART III.

Pharmaceutical Therapeutic Agents, or Drugs.

In this section will be considered, systematically and in alphabetical order, the remedial agents or drugs in present use in the treatment of disease. All of the drugs and preparations made officinal by the United States Pharmacopœia receive notice and consideration in proportion to their importance. Some of the most valuable of the new remedies which are coming largely into use by the profession have also been introduced, these being distinguished from the officinal agents by the absence after them of the letters U. S. P.

Each drug will be considered individually and from three different points of view: (1) the botanical or chemical definition and physical characters of the remedy, with the strength and dosage of its various preparations; (2) its physiological actions, including toxicology and antidotes, with special effects, if any, upon individual organs and tissues; and (3) the therapeutical indications, with illustrative formulæ and suggestions as to eligible forms of administration, or cautions concerning its use. This arrangement is the one which has been found by experience to be the most convenient to facilitate reference and study.

ABIES BALSAMEA. See Terebinthina Canadensis.

ABIES CANADENSIS. See Pix Canadensis.

ABIES EXCELSA. See Pix Burgundica.

ABRUS.—Jequirity, or **Wild Liquorice,** the seeds of Abrus precatorius. (Leguminosæ.)

Pharmacology.—A small plant or shrub, a native of India, but naturalized elsewhere in the tropics. The seeds, or beans, are small, nearly round, of a bright-red color, with a black spot at the hilum. They contain mucilage, abric acid, and a peculiar ferment to which the activity of the infusion appears to be principally due. They do not contain any alkaloid. A globulin and an albumose have also been found in jequirity. These bodies, of similar chemical composition, are both toxic, and their systemic effects have been likened to those produced by the venom of the snake. The temperature is lowered and the blood remains fluid after death. (Martin and Wolfenden.)

Therapy.—The infusion is made by triturating three seeds in a mortar with an ounce of cold water, to which is added an ounce of hot water. When cold, the solution is filtered; the resulting filtrate contains the active principle or ferment, which is highly irritating, and causes a purulent inflammation if introduced into the eye. It has accordingly been used in ophthalmological practice in the treatment of granular lids or trachoma. It is applied three times the first day and repeated on the second and third days, if necessary. This powerful application should be made with care, since Dr. T. E. Murrell, of Little Rock, Ark., describes three cases of stricture of the nasal duct that had resulted from its use too frequently repeated or carelessly watched. An emulsion, made by simply rubbing up the seeds with water, may be painted on with a brush for the treatment of unhealthy ulcers, lupus, and epithelioma.*

The emulsion † recommended by the writer can be prepared in the following manner: 200 grains of the bean are decorticated by being slightly bruised and cracked in a mortar; the red hulls are then carefully picked from the cotyledons and placed in a bottle covered with water. They are thus macerated for twenty-four hours, when they are again transferred to a mortar and thoroughly triturated until they are reduced to a smooth paste, when sufficient water is added to make the whole weigh 800 grains.

Abrus is not used internally. Injection of the infusion into the circulation in the lower animals causes death by septicæmia.

ABSINTHIUM (U. S. P.).—**Wormwood,** the leaves and tops of Artemisia absinthium. (Compositæ.)

Preparations.—Wormwood has no officinal preparations, though it enters into **Vinum aromaticum** (1 part to 100).

Pharmacology.—An herb, bitter and aromatic to the taste, indigenous to Europe, but naturalized in this country, and common along waysides. It contains **Absinthin,** a very bitter, yellowish-white powder, not used in medicine, and also a volatile oil, to which its effects upon the nervous system are principally due. A tincture, flavored with aromatics, forms a cordial called **Absinthe,** used to a large extent in France, where its pernicious effects have attracted the attention of sanitarians. It produces profound disorder of the nervous system, epileptiform convulsions, and, if its use is continued, it renders the subject a physical wreck. These effects are similar to those produced by the volatile oil of wormwood upon the lower animals, in which it acts as a depressor of nervous energy, followed by stupor, clonic muscular spasms, and fatal coma.

* "Jequirity: its Use in Diseases of the Skin," by the author. Transactions of the Medical Society of the State of Pennsylvania, 1884.

† Jequirity. See paper by author, in Medical Bulletin, November, 1884.

According to the experiments of Cadéac and Albin Meunier upon animals, the oil of wormwood, in small and large doses, possesses decided antiseptic properties.

Toxicology.—Poisonous effects may be counteracted by cold affusions, followed by friction of the skin and sinapisms, with careful administration of ammonia by inhalation, by the mouth, or by injection under the skin or into a vein. Evacuation of the contents of the stomach should be obtained by stimulating emetics, or, if these fail, by the stomach-pump. The treatment of **absinthism** calls for hygienic and restorative measures, particularly nerve-tonics, in addition to the usual treatment of alcoholism. The use of absinthe as a stimulant should be discouraged by every means in our power, on account of the rapid deterioration, moral and physical, which it produces when habitually employed.

Therapy.—Wormwood has been used medicinally in the form of infusion (℥i–ij to the Oj), a wineglassful being the dose as a tonic, or as an anthelmintic for children. The dose of the powdered leaves is gr. xx–xl, or, of the oil, gtt. i–iij.

It is a domestic remedy for flatulent dyspepsia and weak digestion. Externally, it has been used as a stimulant application to indolent ulcers. A wine slightly tinctured with wormwood, known as **Vermouth,** is sometimes given to increase appetite and hasten convalescence.

ACACIA (U. S. P.).—**Gum Arabic,** a gummy exudation from Acacia verek and other species of Acacia. (Leguminosæ.)

Preparations.

Mucilago Acaciæ (U. S. P.).—Gum-Arabic Mucilage (34 parts, by weight, with water enough to make 100 parts).

Syrupus Acaciæ (U. S. P.).—Gum-Arabic Syrup (25 parts); Mucilage of Gum Arabic, with syrup (75 parts).

These are the only officinal preparations of acacia, and are simply used as vehicles. The density of the solution of gum arabic enables it to be used to suspend insoluble powders, or oils; in the latter case the resulting mixture is an *emulsion*. As an excipient, gum arabic enters into *Mistura Amygdalæ*, *Mistura Cretæ*, *Pulvis Cretæ Compositus*, *Mistura Glycyrrhizæ Composita*, and several officinal troches. It is a common dusting-powder for pills.

Pharmacology.—Gum arabic comes in white, or nearly colorless, translucent, irregular lumps, or coarse powder, brittle, odorless, almost tasteless. Its solution is valued for its adhesive qualities. Acacia also possesses some nutritive properties, and in the East it is eaten as food. It is soluble in water, but insoluble in alcohol. Its preparations readily undergo acetous fermentation, unless some antiseptic is added to preserve them. As a rule, they require to be freshly made.

Therapy.—In bowel disorders and fevers, a thin mucilage, flavored with lemon and sweetened, makes a nourishing, bland drink which relieves thirst. Irritation in the throat is relieved by gum-arabic troches. Coryza is checked by a snuff of acacia and bismuth subnitrate, to which a little morphine can be added, as in Ferrier's snuff:—

℞ Morphinæ sulphatis,	gr. v.
Pulveris acaciæ,	ʒij.
Bismuthi subnitratis,	ʒvj.

M. et ft. pulvis.

For sore nipples a good combination is as follows:—

℞ Pulveris acaciæ,	ʒiv.
Pulveris sodii boratis,	ʒj.
Pulveris camphoræ,	gr. v.
Pulveris marantæ,	ʒij.

M. Sig.: Dust over the surface.

Another serviceable application in some diseases of the skin is:—

℞ Pulveris acaciæ,	ʒiij.
Pulveris zinci oleatis,	ʒss.
Lanolini,	℥ss.

M. Sig.: Ointment for sore nipples.

The emulsion may likewise be employed as a demulcent vehicle in bronchitis, and in irritation of the genito-urinary passages.

ACETAL, or Di-methyl Acetal.

Pharmacology and Therapy.—A colorless liquid, with ethereal odor and pungent, persistent taste, produced by oxidation of alcohol. In physical characters it resembles alcohol or ether, and is soluble both in alcohol and in water. It acts like alcohol in obtunding sensibility and producing sleep, preceded by lowering of blood-pressure and symptoms of intoxication. It has been administered as a hypnotic in doses of 1 or 2 drachms, but has nothing specially to recommend it.

ACETANILIDE, or Phenyl-acetamide (Antifebrin*).

Dose, gr. v–xv.

Pharmacology.—A derivative of aniline; a white powder, of neutral reaction, slightly pungent, without odor, slightly soluble in water and freely soluble in ether and in alcoholic solutions. It is not changed by acids or alkalies.

Physiological Action.—In ordinary dose the action of acetanilide is much less marked upon a person in health than when fever is present, as

*As the name "Antifebrin" was introduced by the projectors, and patented by them, it should not be used in scientific language or in prescriptions.

its most evident action is to reduce temperature, possibly by converting oxyhæmoglobin into methæmoglobin in the red blood-corpuscle, and interfering with oxidation. When an excessive quantity has been absorbed the alkalinity of the blood is lessened, the red corpuscles destroyed, the hæmoglobin is liberated, and eventually appears in the urine, which becomes dark-brown in color. The quantity of uric acid and urea present in the urine is increased. Large doses cause diastolic arrest of the heart, preceded by motor and sensory paralysis. By smaller doses, the action of the skin and kidneys is increased; the blood-pressure is at first elevated, but soon falls, and the heart's action becomes slower. It is claimed that in moderate amounts it acts as a cerebral and vasomotor stimulant without causing any subsequent ill effects. In some cases, however, whether owing to peculiar susceptibility or impurity in the drug, symptoms of poisoning, cyanosis and collapse have resulted. Vomiting or profuse sweating, accompanied by profound prostration, have also been witnessed as the effect of moderately large doses of acetanilide. These ill effects of the drug must be counteracted by use of external heat, vigorous alcoholic stimulation, together with the hypodermatic use of ether, atropine, and strychnine, in order to support the respiration and circulation. In patients suffering with fatty or dilated heart, it should only be used with great caution, if at all. Owing to its action upon the blood-cells, it should not be used repeatedly or in large doses, in the low fevers. In animals poisoned by acetanilide the heart, liver, kidneys, and other organs have been found affected by fatty degeneration. It is eliminated by the kidneys.

Therapy.—This substance belongs to the aromatic series of antipyretics, derived from coal-tar, and possesses advantages over all the others, owing to its slight taste and usual freedom from ill effects. In single doses of 15 grains or less, or in broken doses (gr. iij every hour or less), it will usually be followed by prompt reduction of the temperature to the normal. It is also antispasmodic, and has been used (doses gr. iii–v) in epilepsy, asthma, and whooping-cough. For the relief of pain it is less efficient than **Antipyrin** (which is an analogous compound, protected by copyright); but it has been employed in nervous affections, and to relieve the pains of facial neuralgia, locomotor ataxia, sciatica, etc., in doses of 10 to 15 grains. In migraine or neuralgic headache it is also an efficient substitute for the much-lauded antipyrin. Acetanilide may be used with lupulin for the affections just named:—

℞ Acetanilid., ... gr. c.
Lupulini, ... gr. c.
M. et ft. capsulæ no. xx.
Sig.: One or two capsules every two or three hours.

It may be employed with camphor, as—

℞ Camphoræ, ... gr. l.
Acetanilid., ... gr. c.

M. et ft. suppositoriæ no. x.
Sig.: Insert one into the bowel every two or three hours for the pain of neuralgia.

Dr. Hollopeter recommends, in simple fevers of children, the following combination :—

℞ Acetanilid., ... gr. xviij.
Hydrarg. chlor. mitis, ... gr. j.
Sodii bicarb., ... gr. xij.
Sacch. lact., ... gr. xv.

M. et ft. chart. no. xij.
Sig.: One every two hours until three are taken.

Acetanilide often proves very useful in acute inflammatory rheumatism, reducing the temperature and relieving the pain and swelling. It is not infrequently speedily efficacious in cases which have received no benefit from salicylic acid or the salicylates. It is capable of notably ameliorating the actual suffering, though it is not always able to prevent relapse.

It has been used in croupous pneumonia by Wroczynski, who believes that, in addition to reducing the temperature, it favorably influences the pathological process in the lung. In scarlatina and other febrile affections among children acetanilide has given very excellent results, though here, also, it must be watched carefully, as a number of cases of intoxication from the drug have occurred among children.

ACIDUM ACETICUM (U. S. P.).—**Acetic Acid,** composed of 36 per cent. absolute acétic acid and water 64 per cent.

ACIDUM ACETICUM GLACIALE (U. S. P.).—**Glacial Acetic Acid** nearly or quite absolute acetic acid.

Preparation.

Acidum Aceticum Dilutum (U. S. P.).—Dilute Acetic Acid contains 6 per cent. absolute acetic acid.

Acetic acid is the basis of the *Aceta*, or the *Officinal Vinegars:* Acetum Lobeliæ, Acetum Opii, Acetum Sanguinariæ, Acetum Scillæ.

Pharmacology and Poisoning.—Acetic acid in the strongest form acts as an escharotic to the tissues; and, if taken internally, is a violent corrosive poison, causing vomiting of sour-smelling liquid, with intense pain followed by convulsions and fatal coma. If the case is prolonged, gastroenteritis is produced by the acid. It has some antiseptic qualities, and slightly increases the acidity of the urine. Glacial acetic acid is partially

eliminated by the intestinal canal, but chiefly by the kidneys. In cases of poisoning, milk or flour and water should be freely given, and vomiting encouraged. Weak alkaline solutions should be administered as chemical antidotes.

Therapy.—The glacial acid is used successfully as an application to lupus, epithelioma, ulcers, papillomata, or warts, and nasal hypertrophies, and also as an application to ringworm and other forms of tinea. Vinegar (not officinal), or dilute acetic acid, has been given internally to check night-sweats and to relieve diarrhœa. Vinegar is a convenient antidote for poisoning by caustic alkalies. It is also used externally for the relief of headache, and the entire surface of the body may be sponged several times a day with vinegar and water to reduce high temperature and acid sweating. It will also prevent the formation of bed-sores.

The following liniment is useful in chronic rheumatism of the joints. It is Stokes's or St. John Long's liniment, the Linimentum Terebinthinæ Aceticum of the National Formulary :—

℞ Ol. terebinth., ... f℥iij.
Ovum recent., ... no. j.
Ol. limonis, ... f℥j.
Acid. acetic., ... f℥v.
Aquæ rosæ, ... f℥iiss.

M. et ft. linimentum.

Properly diluted, acetic acid is sometimes able to mitigate the intense pruritus of urticaria. It is capable also of checking moderate bleeding, as from leech-bites, superficial wounds, and epistaxis. In post-partum hæmorrhage, weakened acetic acid, or vinegar and water, expressed from a mop or sponge into the cavity of the womb, will cause that organ to contract and prevent the loss of more blood. Acetic acid may be of service in bleeding from the stomach. Dr. E. Maguire reports good results in acute gonorrhœa from the use of injections, consisting of 1 part of acetic acid to 4 of water.*

ACIDUM ARSENIOSUM (U. S. P.).—Arsenious Acid.

Dose, gr. $\frac{1}{30}$–$\frac{1}{12}$.

Preparations.

Liquor Acidi Arseniosi (U. S. P.).—1 per cent. *Dose,* ♏i–x.

Liquor Potassii Arsenitis (U. S. P.).—1 per cent. Fowler's Solution. *Dose* ♏i–x.

Liquor Sodii Arseniatis (U. S. P.).—1 per cent. of Arseniate of Sodium.† *Dose,* ♏i–x.

Liquor Arsenii et Hydrargyri Iodidi (U. S. P.).—1 per cent. each Iodide of Arsenic and Biniodide of Mercury. Donovan's Solution. *Dose,* ♏i–x.

Arsenii Iodidum (U. S. P.).—Iodide of Arsenic. *Dose,* gr. $\frac{1}{24}$–$\frac{1}{8}$.

Sodii Arsenias (U. S. P.).—Arseniate of Sodium. *Dose,* gr. $\frac{1}{24}$–$\frac{1}{12}$.

Arsenii Sulphidum.—Sulphide of Arsenic. *Dose,* gr. $\frac{1}{20}$–$\frac{1}{4}$.

* Annual of the Universal Medical Sciences, 1890, vol. v.

† This should not be mistaken for Pearson's solution of arseniate of sodium, which contains only one grain to the ounce.

Pharmacology.—A white, almost tasteless, heavy powder, or in dense mass of crystals, soluble in 30 parts of cold water or 15 of boiling water; also in glycerin and in hydrochloric-acid solution. It is arsenious oxide (A_2O_3), and is prepared by roasting the ore and sublimation. When thrown upon burning charcoal it volatilizes and smells like garlic, the fumes being very poisonous. It is recognized by **Marsh's test**; by the generation of hydrogen in the presence of a solution containing arsenic, arseniuretted hydrogen is produced, which leaves a dark ring on a cold plate held in its flame; this also is extremely poisonous if inhaled. **Reinsch's test** consists in adding a few drops of hydrochloric acid to the suspected solution, and immersing in it a polished plate of copper; the solution being heated metallic arsenic is deposited upon the copper. Arsenic possesses antiseptic qualities, and preserves bodies from decay; when death occurs from its effects, it, therefore, remains for a long time in the stomach, liver, and other organs. Owing to its tastelessness and want of color, arsenious acid is frequently given with homicidal intent, but it is the most easily recognized by its tests of all the mineral poisons. Symptoms of poisoning have resulted from the ingestion of ½ grain of arsenious acid, and death has been produced in the adult by doses of 2 to 4 grains. On the other hand, a case has recently been reported in which recovery occurred after about 154 grains had been taken. **Paris green,** or **Scheele's green,** is an impure arsenite of copper, used for killing potato-bugs, and as a pigment in wall-papers.

Clemen's solution of the bromide of arsenic is made by boiling powdered arsenious acid and potassium carbonate (of each 57½ grains) in distilled water (8 fluidounces), and the resulting solution cooled and increased by the addition of more distilled water (up to 11½ ounces), to which is added pure bromine (115 grains). The fluid is kept four weeks, being frequently shaken during the first week, or until it forms a permanently clear solution. The dose is from 1 to 5 drops daily, freely diluted, and given after meals.

Physiological Action.—To the surface of the skin, if moistened, arsenic acts as an irritant, and produces inflammation and sloughing. In order to obtain its full effects as a caustic, the epidermis should first be removed; but this is not advisable because of the severe pain which attends its use, and on account of the danger of absorption of the poison, especially when used about the mouth. Arsenic is readily absorbed, and is supposed to enter into combination with the red blood-corpuscles. It diminishes the elimination of carbonic acid and probably of urea.

Taken in small doses, arsenic exerts a tonic effect upon the nervous system, stimulates the circulation, and permits an increased amount of

exercise to be taken without fatigue or short breathing. When administered for a long time the system becomes habituated to its use, and much larger doses may, in some cases, be taken without serious consequences. The arsenic-eaters of Styria can take 8 to 10 grains at a dose; they also administer it to the horses in order to improve their condition and enable them to perform more work. It is said that only very few are able to tolerate such large doses, and they are careful not to drink water after taking it; so that absorption probably goes on very slowly, at the same time that it is eliminated rapidly by the kidneys. It is possible that the tolerance may be partly explained by heredity; at all events, imitators of the arsenic-eaters, sooner or later, experience the toxic effects of the drug. Inflammation of the stomach is one of the results of poisoning by arsenic, even when introduced per enema or absorbed through the general surface. The urine becomes scanty, albuminous, or bloody. The skin is affected by arsenic; superficial œdema, especially of the face, appears, and may be followed by eczema, urticaria, herpes zoster, bronzing in patches, or exfoliation of the epidermis. The digestive organs are stimulated by small doses, but large ones cause gastro-enteritis, with burning pain in the epigastric region, vomiting, purging, and collapse resembling Asiatic cholera. In fact, when symptoms of this kind appear in the absence of an epidemic of cholera, they are very likely caused by arsenical poisoning, and should always excite suspicion of the administration of arsenic. Arsenical poisoning is occasionally accompanied by paralysis of one or more extremities. After death from arsenic, fatty degeneration of the heart, liver, kidneys, and other organs has been found. The temperature is depressed by toxic doses. Fly-poison, or cobalt, an impure oxide of arsenic, is sometimes swallowed by mistake; so is rat-poison, made by mixing arsenic and meal ("rough-on-rats" contains 50 per cent.). Arsenic is excreted from the body by the kidneys and intestinal canal.

Antidotes.—The antidotes to arsenious acid are the freshly-precipitated sesquioxide of iron, or the officinal ferri oxidum hydratum cum magnesia, of which about 20 grains must be given for each grain of arsenic swallowed. The solution of dialyzed iron is also a convenient preparation for this purpose. Calcined magnesia and milk may be freely administered, and the stomach emptied by the stomach-pump, or by free vomiting. Oleaginous or mucilaginous drinks are also serviceable. If purging has not occurred the bowels should be emptied by sulphate of magnesia or Rochelle salts. The case subsequently may require treatment for resulting gastric inflammation. In some cases, instead of the gastro-intestinal symptoms, the patient is thrown at once into a condition of coma, as if he had taken a narcotic. The autopsy reveals

lesions of the œsophagus and stomach, with erosions and ecchymoses, congestion of the lungs, and fatty degeneration of different organs. The arsenic may be detected not only in the contents of the stomach, but also in the urine and in the tissues, especially the liver and great nerve-centres.

Therapy.—When administered internally it has occasionally shown considerable power over morbid growths, and is the only remedy we have at our command that has any effect upon the development of cancer of the viscera. In epithelial cancer and other superficial growths arsenical paste has been employed (cinnabar, 70; dragon's blood, 22; arsenious acid, 8), but, as previously stated, it is a very painful treatment, and may only be applied to a small area at a time on account of the danger of producing toxic effects.*

In ague and chronic malarial disorders, and also as a prophylactic against malarial poisoning, arsenic is used very effectually in small doses, and may be combined with quinine and iron :—

℞ Liq. potassii arsenitis,	♏iii–v.
Tr. cinchona comp.,	f3ij.

M. pro dosi.

℞ Sodii arseniatis,	gr. j.
Mass. ferri carbonatis,	gr. xx.
Quininæ sulph.,	gr. xx.

M. et ft. pil. no. xx.
Sig. : One three times a day.

℞ Arsenii sulphidi,	gr. ij.
Aloini,	gr. j.
Ferri pyrophos.,	gr. xl.

M. et ft. pil. no. xx.
Sig. : One three times a day.

In neuralgia, arsenic frequently exercises a very happy effect, especially when given in the form of the solution of sodium arseniate. Larger doses are required for some cases of chorea, but the effect is very marked.

It may be administered with advantage thus :—

℞ Liq. sodii arseniatis,	f3j.
Fl. ext. Hoang-Nan,	f3j.
Elix. gentianæ ferrat.,	f℥v.

M. Sig. : One teaspoonful in water after meals. Used in neuralgia and chorea.

Some spasmodic disorders of respiration, asthma, hay fever, and chronic catarrhal bronchitis are controlled by arsenic, and if there is no acute inflammation it may be used with the atomizer.

In irritative dyspepsia, with morning vomiting and clean, red tongue

* The ignorant or excessive use of an arsenical paste or powder has been known to cause death through absorption.

arsenic is of service; also in the diarrhœa coming on immediately after eating.

In skin diseases arsenic is valuable in proportion to the absence of irritation or acute inflammation. In all chronic processes, especially when accompanied by desquamation or infiltration of the skin, such as psoriasis, the persistent use of small doses is often curative; also in the dry form of eczema and impetigo, as well as in pemphigus and lichen. It is contra-indicated in the early stage of each of these affections except psoriasis.

The following are serviceable formulæ in the diseases referred to :—

℞ Liq. potassii arsenitis, ... f℥j.
Tinct. nucis vomicæ, ... f℥ij.

M. Sig.: From 15 to 20 drops in water three times a day.

℞ Sulphuris sublimati, ... gr. c.
Acidi arseniosi, ... gr. j.

M. et ft. capsulæ no. xx.
Sig.: One after meals.

In diabetes mellitus, the solution of the bromide of arsenic (not officinal) taken in Vichy water after each meal has produced remarkable results in the hands of Clemens, probably owing to its action upon the liver. In disease of the liver or kidneys, especially the early stage of cirrhosis, arsenic sometimes has a very decided effect.

In vomiting and diarrhœa, especially in infancy, the arsenite of copper in infinitesimal doses (gr. $\frac{1}{100}$ to water f℥iv, a teaspoonful being given every hour or less) has been followed by good results; but the older method of using Fowler's solution in the same way is probably better because less poisonous than the arsenite of copper; the effect being largely due to the antiseptic action of the arsenic, which acts more efficiently in the soluble form.

The vomiting of pregnancy is often remarkably relieved by the administration of a drop of Fowler's solution immediately before each meal. The same preparation is valuable in chronic gastritis (especially when it has been produced by alcohol), in chronic gastric ulcer, and cancer of the stomach. Arsenic is sometimes beneficial in chronic rheumatism.

Syphilitic affections are sometimes better treated by the combination of mercury with arsenic than by mercury alone. Donovan's solution is especially useful in old syphilitic skin lesions.

Finally, in chlorosis and anæmia the tonic effects of arsenic may well be combined with those of quinine and of iron. The usual dose of arsenious acid is $\frac{1}{24}$ grain, to be cautiously increased. The best method of administration is in solution.

Radcliffe was the first to use arsenic hypodermatically for the relief

of chorea, in 1866, and since then it has been frequently used in scaly skin diseases, lymphadenomata, and nervous disorders.

The ointment of oleate* of arsenic is also a useful application in the treatment of old ulcers, epithelioma, and lupus. The following combination will be found of service in the diseases just named :—

℞ Morphinæ sulphatis,	gr. ij.
Zinci chloridi,	gr. v.
Pulveris marantæ,	ʒj.
Ungt. arsenii oleatis,	℥ss.

M. Sig.: Apply on old muslin for several hours.

The iodide of arsenic (gr. iv or v–℥j) in ointment is a valuable stimulating application in old dry eczema. In lupus it may be made stronger, or we may combine it with corrosive sublimate :—

℞ Hydrarg. chlor. corros.,	ʒiiss.
Acidi arseniosi,	ʒj.
Hydrarg. sulphidi rubri,	gr. xl.

Mix with water to a paste and apply with a brush.

In warts, Unna advises the application of mercurial ointment containing from 5 to 10 per cent. of arsenic.

ACIDUM BENZOICUM (U. S. P.).—**Benzoic Acid.** See Benzoinum.

ACIDUM BORICUM (U. S. P.).—**Boric Acid,** formerly **Boracic Acid. Dose,** gr. v–xxx.

Preparation.

Sodii Boras (U. S. P.).—Borate of Sodium, or Borax. *Dose*, gr. v–xxx.

Pharmacology.—Boric acid is in transparent, colorless, six-sided plates, soluble in 25 parts of water or 15 parts of alcohol, and in 3 parts of boiling water or 5 of boiling alcohol. The alcoholic solution has a green flame. Borax is soluble in 16 parts of cold water, but not in alcohol. Boric acid has a feebly-acid taste and borax a sweetish, alkaline taste and alkaline reaction. **Boroglyceride** (not officinal) is a combination of boric acid (62 parts) and glycerin (92 parts). When diluted with an equal quantity of glycerin, it makes the 50-per-cent. boroglyceride, in which form it is used as an antiseptic.

Lister's antiseptic ointment for dressing wounds is made by adding 1 part each of boric acid and white wax to 2 parts each of paraffin and almond-oil. Borated lint or borated cotton-wool (absorbent cotton) is made by steeping the substance in a saturated solution of boric acid and allowing it to dry.

Physiological Action and Therapy.—Boric acid is antiseptic. It is entirely unirritating when applied to the skin, and has been used as a

* See Ointments and Oleates, especially in Skin Diseases, by the author. F. A. Davis, 1890.

dressing for wounds. Suppuration of the ear, or running from the ear, is cured by cleansing the canal and insufflating finely-powdered boric acid. The saturated solution is used in various chronic, scaly, and parasitic skin eruptions, and is the best remedy for bromidrosis of the feet, or fetid perspiration. Among the beneficial combinations are:—

℞ Acidi borici, ... ʒiij.
Bismuthi subnit., ... ʒiij.
M. Sig.: For running from the ear and in excessive and fetid perspiration.

℞ Acidi borici, ... ʒij.
Pulv. zinci carb. imp., ... ℥ss.
M. Sig.: In acute eczema and erythema.

℞ Acidi borici, ... ʒj.
Aquæ hamamelidis dest., ... f℥iv.
M. Sig.: Use in fetid perspiration and in an oily state of the skin.

Borax in substance is applied to aphthous sore mouth in infants, mixed with white sugar; its solution is a cooling application to superficial inflammations of the skin, and for pityriasis versicolor and seborrhœa of the scalp, or dandruff. Internally, borax, in 20-grain doses, relieves irritable bladder and reduces the acidity of the urine. (For Dobell's solution see next page.) It has, in some instances, given encouraging results in epilepsy.

Boroglyceride (50 per cent.) is a pleasant and efficient application for conjunctivitis, pharyngitis, and as a dressing for wounds and granulating surfaces, having the important advantage of not being poisonous. It is especially recommended for the local treatment of diphtheria. Boroglyceride ointment, made by adding it to unguentum aquæ rosæ, is a pleasant application for sunburn, pruritus, and other skin affections. Boric-acid ointment (in lanolin or zinc ointment, 1 to 6) is used as a dressing for wounds and ulcers. The solution of boroglyceride is a valuable application in chronic eczema of the palms of the hands and the soles of the feet. It is also useful in subacute and chronic eczema of the genital organs, especially when the scrotum is invaded. It can be prescribed with witch-hazel:—

℞ Sol. boroglyceridi (50 per cent.), ... f℥iij.
Aquæ hamamelidis dest., ... f℥ij.
M. Sig: Apply with old muslin.

ACIDUM CARBOLICUM (U. S. P.).—**Carbolic Acid, Phenol.** **Dose**, gr. ss–ij. If liquefied, ♏i–ij.

ACIDUM CARBOLICUM CRUDUM (U.S.P.).—**Crude Carbolic Acid.**

Preparations.

Unguentum Acidi Carbolici (U. S. P.).—Ointment of Carbolic Acid, 10 per cent.
Sodii Sulphocarbolas (U. S. P.).—Sulphocarbolate of Sodium. *Dose*, gr v–xxx.

Pharmacology.—Carbolic acid is a liquid obtained during the distillation of coal-tar between the temperatures of 180° and 190° C. (356° to 374° F.). What is called crude carbolic acid is distilled at a somewhat lower temperature, and contains also cresylic acid and other substances which render it unfit for medicinal use except as a disinfectant for drains, etc. The pure acid is crystalline at ordinary temperatures, and at first is colorless, but reddens after exposure to the air. It has a characteristic odor and pungent taste; it is very soluble in all the usual menstrua, having the peculiarity of being liquefied by 5 per cent. of water; but the further addition of water produces turbidity until the proportions are reversed (1 to 20), when it remains permanently clear and is not affected by further dilution. It resembles creasote in its disinfectant properties, but differs from it by being converted into picric acid when nitric acid is added to it; whereas, with creasote, nitric acid forms oxalic acid. Resorcin is also of a similar character, but is in the form of a powder. Both creasote and resorcin will be considered separately.

The following unofficinal preparations are sometimes used :—

Unofficinal Preparations.

Glyceritum Acidi Carbolici (25 per cent.). External use.

Aqua Acidi Carbolici (ʒij in Oj, or glycerite, ʒx in Oj). *Dose*, fʒi–ij; also as a wash, gargle, or spray.

Unguentum Acidi Carbolici (with simple ointment, 1 to 9).

Carbasus Acidi Carbolici (gauze, containing carbolic acid 1, resin 5, paraffin 7 parts).

Oleum Acidi Carbolici (1 in 20 of olive- or cottonseed- oil).

Suppositoria Acidi Carbolici (each containing 1 grain).

Campho-Phenique.—Carbolic-Acid Camphor. Dissolve 9 parts acid in 1 of alcohol, and mix with 25 parts camphor, forming a clear, oily solution.

Liquor Sodii Carbolatus.—Phenol-Sodique. Carbolic acid, gr. clxxxviij; caustic soda, gr. xxxj; water, f℥iv. For external use, properly diluted.

Liquor Sodii Boratis Compositus.—Dobell's Solution. Borax and sodium bicarbonate, each, ʒij; carbolic acid, gr. xxiv, in water, Oj. For external use in spray for nose and throat.

Tri-Brom-Phenol.—A compound of Bromine with Carbolic Acid. In the form of soft, white needles; used externally as an antiseptic.

Calcium Carbolatum.—Carbolated Lime. For disinfecting purposes.

Physiological Action.—Carbolic acid and its preparations are distinguished by their destructive action upon the lower forms of life, but owing to their tarry smell they cannot be used for preserving food, like boric acid, and are not popular in the household. When applied to the skin, carbolic acid causes irritation, and sometimes sloughing; it is a local anæsthetic. It is also readily absorbed through the skin, and toxic effects have been produced in this way, although much more frequently by the absorption through the raw surface of a recent wound. The urine is diminished in quantity, and on standing acquires an olive-green color

this is generally the earliest symptom of intoxication. We also notice loss of appetite, nausea, vomiting, frothy salivation, difficulty in swallowing, and nervous symptoms. The pupils are contracted and the functions of the brain and spinal cord are affected, suspended reflexes and impaired sensibility and motility being observed. Death occurs from respiratory paralysis; the temperature is at first increased, but afterward is reduced. In severe cases there is shock, great pallor, and sudden death. At the autopsy the drug may be recognized by its penetrating odor; evidences of corrosive action may be seen if taken in concentrated form, but even in small quantities it produces gastritis. As elimination takes place principally by the urine, the kidneys may be congested or inflamed; the blood is dark and imperfectly coagulated.

Treatment of Poisoning.—When carbolic acid has been swallowed prompt treatment is required. The soluble sulphates (soda or magnesia) are the best antidotes, but the liquor calcis saccharatus, or syrup of lime, is also useful, if at hand. Alkalies, soap, albumin, flour and water may be given, and the stomach washed out with the stomach-pump. Oils should not be given, as they favor absorption. The bowels should be freely opened with Epsom salt, to carry off any acid from the intestinal tract. Collapse is relieved by hypodermatic injections of atropine, by hot applications, arterial stimulants, and friction. The soluble sulphates should be administered in small doses for several days, in order to remove the carbolic acid from the system.

Therapy.—The antizymotic and antiseptic qualities of carbolic acid have been largely utilized in surgery, although it has now been nearly superseded by the solutions of mercury, which have no offensive odor. Formerly the spray of carbolic water was considered an indispensable feature of the Listerian method, but this has been found to be unnecessary and has been abandoned, as asepsis can be secured without it. It is still used, however, as a detergent and as an application upon dressings. In the treatment of carbuncle or malignant pustule, after incision and scraping, the application of pure carbolic acid not only acts as an antiseptic, but also as a local anæsthetic, relieving pain. The camphophenique, being free from offensive odor, may be used as a substitute for the pure acid.

In weak solutions carbolic acid has been used as a parasiticide in various forms of tinea; and it has also been used topically for the prevention of pitting from small-pox, and in the treatment of burns, in the form especially of carbolized oil. In acute vesicular eczema, erythema, and in dermatitis, especially from various poisonous substances, the writer has employed this combination with great service:—

℞ Acidi carbolici,	gtt. vj.
Pulveris zinci carb. imp.,	℥j.
Liq. calcis,	f℥iij.
Glycerini,	f℥iij.

M. Sig.: Shake well, and mop frequently over the surface.

An ointment containing carbolic acid, sulphur, and camphor is most effective in many pruritic diseases of the skin, especially papular eczema, psoriasis, lichen, and urticaria or nettle-rash :—

℞ Acidi carbolici,	gtt. v vel x.
Sulphuris subl.,	ʒss.
Camphoræ,	gr. x.
Ungt. zinci oxidi,	℥j.

M. Sig.: Apply frequently to the irritable surface.

Internally, carbolic acid sometimes rather unexpectedly produces symptoms of poisoning, which fact restricts its use. In fermentation accompanying flatulent dyspepsia and in dilated stomach, carbolic acid will check the process and relieve the symptoms. It is useful in irritable vomiting, given frequently in broken doses. The author suggests the following prescriptions in the variety of dyspepsia referred to :—

℞ Acidi carbolici,	gtt. iv.
Pulv. aromatic.,	gr. xij.

M. et ft. pil. no. xij.
Sig.: One before meals.

℞ Acidi carbolici,	gtt. v.
Syrupi acaciæ,	f℥iss.
Aquæ cinnamomi,	f℥iss.

M. Sig.: One teaspoonful before meals.

It has been used in pill form in the treatment of tape-worm. It is part of the so-called specific treatment of typhoid fever in extemporaneous combination with tincture of iodine (1 to 2 of iodine) in doses of gtt. ii–iij every three or four hours, given in mint-water. In offensive breath, the cause may be in the mouth, throat, or bronchi, and in any of these cases the use of the steam-atomizer with a 5-per-cent. solution of carbolic acid will often relieve the patient very promptly. Caries of the teeth may be relieved by a mouth-wash containing carbolic acid or phenol-sodique, well diluted. The same applied with a brush or atomizer has been used in diphtheria and various forms of sore throat. Weak solutions are used in hay fever, chronic nasal catarrh, coryza, and influenza, and afford marked relief; the one known as Dobell's solution is widely used for the purpose, and for cleansing the nostrils previous to making local applications.

Parenchymatous injections of a 2-per-cent. solution have been made

for checking the progress of erysipelas, and also into the cavities of the lungs in pulmonary phthisis. In the early stage of furuncle, and in enlarged lymphatic glands, the hypodermatic injection of the same solution will often prove effectual in preventing the formation of pus. The pure acid (♏xv–xx) has been used by Levis as an injection into the tunica vaginalis in cases of hydrocele, with successful results. In hæmorrhoids, carbolic acid, either pure or diluted with oil, has been employed with satisfactory results, but there have been some accidents. It has also been recommended in weak solution for the treatment of ascarides by enema, but the danger of absorption is too great for its use in this way; it may, however, be applied externally, as it is an excellent antipruritic.

The vapor of carbolic acid may be inhaled for whooping-cough or phthisis, in the place of the spray, by placing a few drops upon some absorbent cotton in an inhaler.

In the septic diseases,—small-pox, septicæmia, puerperal fever, etc., —the sulpho-carbolates have been used with asserted success. In typhoid fever, Dr. Waugh has had good results from the sulphocarbolate of zinc in doses of gr. ii–iij, four or five times a day. It has the advantage, over the carbolic acid and iodine treatment, of being less depressing to the heart and less injurious to the kidneys.

ACIDUM CHROMICUM (U. S. P.).—Chromic Acid, CrO_3.

Preparation.

Potassii Bichromas (U. S. P.).—Bichromate of Potassium. *Dose*, gr. $\frac{1}{10}$–$\frac{1}{3}$.

Pharmacology.—Chromic acid occurs in the form of small, crimson, needle-shaped crystals, deliquescent and very soluble in water. They should not be added to alcohol, as mutual decomposition takes place, sometimes explosively. An explosion results instantly from a mixture of 1 part of chromic acid with 2 parts of glycerin. For the same reason chromic acid should never be combined with spirit of nitrous ether.

Physiological Action and Toxicology.—On account of its marked affinity for water and its contained oxygen, chromic acid rapidly destroys tissues, forming an eschar, and it is a powerful antiseptic. In solution (from 5 to 20 per cent.) it acts as a caustic. When swallowed it is a corrosive poison, and requires prompt treatment by demulcents and alkalies, with irrigation of the stomach. If death does not occur at once from shock it may result from inflammation and sphacelation of the mucous coats of the stomach. Workmen in factories where chromic acid is used are liable to have perforation of the nasal septum from the local action of the acid applied accidentally upon the fingers. The electropoion fluid (*Liquor Electropoiecus*, N. F.), or **battery fluid**, contains bichromate of potassium in powder, 6 ounces; commercial sulphuric acid, 6 fluidounces;

cold water, 48 fluidounces). Being of an attractive red color, and in such common use among physicians, it may be swallowed by mistake, and instances of poisoning are not uncommon. In such cases, soap-suds and milk may be given at once, and the stomach carefully washed out with a soft tube, as vomiting may rupture the stomach. Arterial stimulants and external counter-irritation and hot applications may be required. Chrome yellow, or the chromate of lead, has been used by bakers in order to give a rich color to cakes. A number of cases arising from this adulteration have been investigated by Dr. D. D. Stewart, of Philadelphia. Though mentioned here incidentally, the symptoms are principally indicative of lead poisoning.

Therapy.—The solution of chromic acid is an excellent remedy for warts, syphilitic mucous patches, and enlarged tonsils (gr. x ad aq. ℥j), applied with cotton or a camel's hair brush once or twice a day. It has also been used in gynæcological practice in uterine hæmorrhage and endocervicitis, and has been injected into hæmorrhoids, and applied to hypertrophies of the nasal chambers, and also to some malignant growths. Sweating of the feet (hyperidrosis) is relieved by sponging the feet daily with a weak solution. Parasitic skin diseases, sycosis, lupus, tinea circinata, and condylomata, require a stronger solution (gr. c to ℥j). As the caustic action tends to spread, it should be used with caution, covering the neighboring surface with ointment, and promptly removing excess of acid with an alkaline wash.

Chromic acid is not used internally; but the potassium bichromate has been administered in doses of $\frac{1}{10}$ to $\frac{1}{8}$ grain; it acts as an emetic in doses of $\frac{3}{4}$ grain. It has been used in chronic rheumatism and syphilis made into pill with some vegetable bitter, but is of doubtful utility. In cases of poisoning by bichromate of potash the same means are employed as in chromic-acid poisoning.

ACIDUM CITRICUM (U. S. P.).—Citric Acid.

Dose, gr. x–ʒss.

Preparation.

Syrupus Acidi Citrici (U. S. P.).—8 to 1000 simple syrup.

The officinal citrates are citrate of lithia, citrate of potash, and solutions of citrate of potash, magnesia, and iron. The syrup forms a pleasant excipient

Pharmacology.—Citric acid is obtained from lemon- or lime- juice; it occurs in the form of colorless crystals soluble in less than their own weight of water; it has a sour taste, not unpleasant in weak solutions. In substance it is irritating to the gastro-intestinal mucous membrane, and may thus act as a poison. It renders the urine acid. It is eliminated to some extent by the bowels, but principally by the kidneys.

Therapy.—In the proportion of 570 grains to 1 pint of distilled water it forms a solution of the average acidity of lemon-juice, which may be further diluted and sweetened as a refrigerant drink for fever. It has been used also as a substitute for fresh lemon-juice in the treatment of scurvy, but is less efficient. Dose of the acid, gr. x to ʒss. It has the power of sterilizing polluted water.

ACIDUM GALLICUM (U. S. P.).—**Gallic Acid.**
Dose, gr. ii–x.

Preparation.

Unguentum Acidi Gallici (U. S. P.).—10 per cent., with benzoinated lard.

Pharmacology.—Galls are lumps or nodes upon the oak-tree, caused by insects. According to the pharmacopœial definition, gallæ are "excrescences on Quercus lusitanica, var. infectoria, caused by the punctures and deposited ova of Cynips gallæ tinctoria," an insect of the order Hymenoptera. They contain about 50 per cent. of tannic acid, which chemically is an anhydride of gallic acid, and, in fact, is convertible into gallic acid by immersion in water. The dose is from 5 to 10 or 20 grains. It is an antidote to antimony or tartar emetic. Its solutions strike a black color in the presence of iron, and they should not be prescribed in combination with chalybeates.

Therapy.—Gallic acid is in the form of long needles, nearly colorless, slightly acid, though less astringent than tannin; it is soluble in 100 parts of cold water, $4\frac{1}{2}$ parts of alcohol, or 3 parts of boiling water. Like tannin, it has the effect of restraining secretion, reducing swelling, and hardening tissues. It is eliminated by the kidneys under its own form. In the form of the glycerite (ʒj to ℥j of glycerin) it forms a favorite application to sore throat or tonsillitis; and the ointment of gallic acid is a good application to hæmorrhoids, being an improvement upon the ointment made of powdered galls. The alcoholic solution is useful as a local application to the membranes in diphtheria.

Internally, gallic acid is given in hæmorrhage (gr. xx at a dose) from the alimentary canal, kidneys, or lungs; also in menorrhagia, but here it is inferior to ergot.

In hæmoptysis, ulcer of the stomach, hæmorrhage from the bowel, especially in typhoid fever, the following formulæ can be used:—

℞ Acid. gallic.,	ʒij.
Acid. sulphuric. arom.,	fʒj.
Morphinæ sulph.,	gr. j.
Tinct. cardamom. co.,	f℥j.
Aquæ rosæ,	f℥ij.

M. Sig.: One teaspoonful in water every hour or two.

℞ Acid. gallic., ... ʒij.
Glycerini, ... f℥iij.

M. Sig.: One teaspoonful every half hour or hour until relieved.

It has also been used to reduce the quantity of albumin in the form of chronic renal disease commonly called Bright's disease.

On account of its astringent effects gallic acid is useful in a number of disorders attended by excessive secretion or transudation, as chronic bronchitis, cystitis, chronic diarrhœa, dysentery, and the night-sweats of phthisis. It is likewise serviceable in purpura hæmorrhagica. It retards the progress of pyelitis or pyelo-nephritis, and diminishes suppuration. Combined with opium, it has been found beneficial in diabetes insipidus.

Pyrogallic acid is obtained from gallic acid by heat; it is used externally in the treatment of acne, but has the disadvantage of discoloring the skin.

ACIDUM HYDRIODICUM.—Hydriodic Acid.

Pharmacology.—Hydriodic acid is a gas prepared by the action of iodine upon phosphorus in the presence of water, with the aid of gentle heat. It is colorless, but produces white fumes in air; it can be liquefied or even rendered solid by strong pressure and a low temperature. A solution of hydriodic acid in water, if exposed to the air, soon becomes discolored, and after a time deposits crystals of iodine. The solution is not officinal, but the United States Pharmacopœia recognizes a

Syrupus Acidi Hydriodici (U. S. P.), Syrup of Hydriodic Acid, which contains 1 per cent. of absolute acid; the dose being from 30 minims to half an ounce.

Therapy.—The syrup of hydriodic acid* is a valuable means of introducing iodine into the system, and it will be considered further under Iodine. When administered in this way the iodine is liberated in the body and is peculiarly active in the nascent form, and especially adapted for administration to scrofulous subjects and cases of catarrhal pneumonia of the chronic type. In some skin diseases of the same character the syrup of hydriodic acid, when carefully made, has proved of great value. It is very efficacious in spasmodic asthma, especially of that variety which is linked with the gouty diathesis.

ACIDUM HYDROBROMICUM DILUTUM (U. S. P.).—Diluted Hydrobromic Acid. Dose, ♏x–f℥iv.

Preparation.

Quinine Hydrobromate is the only officinal salt. *Dose*, gr. i–xx.

Pharmacology.—Hydrobromic acid resembles hydrochloric acid in being officinal only in solution, each being a gaseous substance. Dilute

* "Hydriodic Acid," by the author, in Medical Bulletin for August, 1889.

hydrobromic acid contains 10 per cent. of absolute hydrobromic acid. Its usual dose is from ♏x to fʒiv. It is a clear, colorless solution with an acid taste, and can be given in lemon-syrup or simple elixir.

Therapy.—Hydrobromic acid should be an excellent antiseptic for dressing wounds, being sedative, non-poisonous, and bactericide in its action. It was introduced as a substitute for the bromides, but it has not fulfilled the expectations of its projectors, although it has some anodyne and hypnotic effects. It is more pleasant to take than the bromides, and in some cases of nervous cough, neuralgia, headache, and nervousness it has a good effect, but is ordinarily given in too small doses. De Schweinitz has found it useful in headache due to eye-strain. In cases of annoying tinnitus after taking quinine it is said to give prompt relief, although it often fails in relieving tinnitus from other causes. Two fluidrachms are equivalent to 18 grains of potassium bromide.

To relieve irritative cough in phthisis :—

℞ Codeinæ,	gr. j.
Acidi hydrobromici dil.,	f℥j.
Syr. aurantii,	f℥ij.

M. et ft. mistura. *Dose*, ʒi–ij.

Bromine is considered under the head Bromum, in proper order.

ACIDUM HYDROCHLORICUM (U. S. P.).—**Hydrochloric Acid,** formerly **Muriatic Acid.**

Preparation.

Acidum Hydrochloricum Dilutum (U. S. P.).—Dilute Hydrochloric Acid. *Dose*, ♏x–xxx.

Pharmacology.—The officinal hydrochlorates are of apomorphine, morphine, pilocarpine, and quinine. Aqua chlori is also officinal. Hydrochloric acid is an irritating, irrespirable gas. The preparation officinal under this name contains 31.9 per cent. of absolute hydrochloric acid in water. The dilute hydrochloric acid contains 6 parts of the strong solution with 13 parts of distilled water. The latter is generally used for internal administration, as the stronger solution allows the gas to escape, the pungent fumes of which are unpleasant. The solutions are clear, colorless, and decidedly acid. When applied to the skin they are antiseptic and astringent; in some persons with delicate skin hydrochloric acid is irritating and slightly caustic.

Physiological Action and Toxicology.—When taken internally in poisonous doses, it acts as a violent irritant, causing burning pain, a strong acid taste in the mouth, red and swollen tongue, and discoloration of the lips. Vomiting occurs at once, and may be accompanied by bleeding. The patient is at first feverish, but soon falls into collapse and dies of shock or exhaustion. Violent gastric inflammation is found after death, and the œsophagus and mouth show the effects of a corrosive poison.

The vapor of ammonia escaping near the vomited matters produces a white cloud of chloride of ammonium. The treatment is the same as for other corrosive mineral acids,—demulcent drinks, flour or soap and water, milk, oil, or eggs. The carbonates may be given cautiously, for fear of rupturing the stomach by the escaping carbonic-acid gas. The stomach being softened by the acid, it should be evacuated by the tube rather than by emetics, if vomiting does not occur spontaneously. There is, moreover, danger that in the act of vomiting a portion of the acid may find its way into the air-passages and thus still further extend the mischief. Subsequently, the patient must be treated for the resulting lesions, which are not limited to the intestinal tract, since congestions of the kidneys and lungs may also occur.

Therapy.—Topically, hydrochloric acid is applied to septic wounds, dissecting wounds, or bites of rabid animals. It has also been used, mixed with an equal proportion of honey, as an application to the throat in diphtheria. It is important that this application should be made only to the diseased surface. It is a good addition to baths in cases of skin disease, as pityriasis versicolor or tinea, and in full strength it is used to destroy warts on the hands of children.

When hydrochloric acid is given well diluted it is acceptable to the stomach, being one of the constituents of the gastric juice. When fermentation of the food takes place, causing flatulence or "windy dyspepsia," it may be due to a deficiency of this element. At all events, cases of weak digestion and dyspepsia are sometimes much benefited by 10 or 20 drops of the dilute acid with half the quantity of tincture of nux vomica, after each meal. Where acid stomach is caused by the presence of bacteria, the antiseptic action is best obtained by administering the hydrochloric acid when the stomach is empty, shortly before eating. It is also held that the excessive secretion of hydrochloric acid (which forms one variety of acid stomach) may be prevented by administering an acid solution just before eating, on the rule that acids check acid secretions. Hydrochloric acid sometimes affords great relief in nausea. In intestinal indigestion with diarrhœa, this agent is also very effective, given one or two hours after meals. The temporary administration of pepsin in combination with the acid is of great value in cases of this kind, but the pepsin should not be continued too long, or the peptic glands may lose their functions.

A good mixture which is very beneficial is :—

℞ Acid. hydrochlor. dil.,	fℨiv.
Pepsin. pur.,	ℨiv.
Glycerini,	f℥iij.

M. Sig.: One teaspoonful in water after meals.

In fevers, where the secretions are very much diminished and hydrochloric acid is not secreted, its administration is of great service in assisting digestion and preventing the development of micro-organisms. In typhoid fever this is the most common treatment (gtt. x–xx, every three hours), and it exercises an important influence upon the contents of the bowels, being slightly astringent and preventing the multiplication of bacilli. Relapse is less frequent under this treatment because auto-infection is less likely to occur. In other infectious zymotic diseases, as scarlet fever, small-pox, or diphtheria, hydrochloric acid may be administered in the same way. In phthisis it is serviceable in disinfecting to some extent the alimentary canal, checking excessive sweating, or watery discharges from the bowels, and promoting constructive metamorphosis.

A very beneficial combination for phthisis will be :—

℞ Acid. hydrochlor. dil., ... ♏cc.
Tinct. nucis vomicæ, ... ♏cc.
Tinct. capsici,. . . . . f℥j.
Tinct. cinchonæ, ... f℥v.

M. Sig.: Two teaspoonfuls in water after meals.

The officinal liquor pepsini contains saccharated pepsin, 40 parts; hydrochloric acid, 12 parts; glycerin, 400 parts; and water to make 1000 parts. The usual dose is a tablespoonful after eating.

Chlorine, for bleaching or disinfecting purposes, can be obtained by pouring hydrochloric acid upon manganese binoxide. It is a greenish-colored, intensely irritating gas. (See Aqua Chlori.)

ACIDUM HYDROCYANICUM DILUTUM (U. S. P.).—**Dilute Hydrocyanic Acid,** sometimes called **Prussic Acid.**

Dose, ♏ i–v.

Pharmacology.—A liquid composed of 2 per cent. of absolute hydrocyanic acid and 98 per cent. of alcohol and water. It is colorless, faintly acid, with taste and odor of peach-kernels, rapidly loses the volatile acid when exposed to the air and light, and deteriorates if kept too long; so that the dose is variable. The usual dose is from 1 to 5 minims, but we should always commence with the minimum dose and cautiously increase, because of the different degrees of activity of this preparation. Cherry-laurel water (Aqua laurocerasi) is officinal in European pharmacopœias, but not in ours; it is also of very variable strength, but is used in somewhat larger doses (♏ v–xx). The cyanides of mercury, potassium, and silver are officinal. By the addition of an acid to any of these salts, it will be decomposed and hydrocyanic acid set free, as in the following prescription :—

℞ Potassii cyanidum, ... gr. j.
Acid. citric., ... gr. v.
Syr. tolutani, ... f℥ii vel iij.
M. Sig.: A teaspoonful at a dose for an irritable cough.

Physiological Action and Toxicology.—Hydrocyanic acid is very poisonous as a gas, and even in the ordinary solution, in sufficient quantities to cause death, it is almost immediately fatal. In cases where it does not cause death at once, there is great prostration of bodily powers; weak, fluttering pulse; cold extremities, and impending collapse. Atropine, hypodermatically, is the physiological antidote; but no time should be lost before emptying the stomach with the aid of stimulating emetics. Cold affusions to the spine, with frictions and sinapisms to the surface, and hot applications are also efficient. The peculiar bitter-almond odor of the ejecta indicates the character of the poison. Death generally occurs by suffocation from paralysis of respiration. Elimination, as well as absorption, of hydrocyanic acid is very rapid. Ringer states that if life can be supported for half an hour recovery will usually occur.

Locally, hydrocyanic acid at first slightly irritates the skin, but afterward acts as a sedative. It should not be used in skin diseases when the skin is broken, for fear of absorption. It has some action upon the brain, causing vertigo and hebetude; the respiratory centre is enfeebled and the motor nerves paralyzed, producing great muscular feebleness. The conducting power of the sensory nerves is diminished. It is a decided cardiac sedative, the pulse becoming slow, with lowered arterial tension. The poison also acts upon the respiratory function of the red blood-corpuscles, and prevents them from carrying sufficient oxygen to the tissues.

Therapy.—Hydrocyanic acid has been used as an antispasmodic in various forms of reflex vomiting, such as the vomiting of pregnancy and that of phthisis. It has also been employed in nervous cough, in irritable heart, and asthma. As it is rapidly eliminated from the system, the dose should be repeated at short intervals. Its sedative effect upon the gastric mucous membrane renders it valuable in painful affections of that organ, such as gastralgia, ulcer, and cancer. The same benefit is obtained from its use in enteralgia. For external use it may be added to rose-water (ʒii–℥viij) with a little glycerin, to be applied in cases of troublesome pruritus.

ACIDUM HYDROFLUORICUM.—Hydrofluoric Acid.

This is also an irrespirable gas, but is dispensed in solution with distilled water (1 to 200), and administered in doses of 10 to 20 minims.

The gas has the power of acting upon glass, and the solution must be kept in rubber bottles.

Under the theory that this gas would exert a destructive influence on the bacilli, hydrofluoric acid has been tried in phthisis, but the results have not supported the theory. The fluorides of ammonia and iron have been also tried in medicine, but with no better result.

ACIDUM LACTICUM (U. S. P.).—**Lactic Acid.**
Dose, ♏xx–ʒss.

Preparation.

Ferri lactas (U. S. P.).—Lactate of iron. *Dose*, gr. ii–v.

Pharmacology.—A colorless, odorless, syrupy liquid, with an acid taste, containing 75 per cent. of lactic acid and 25 per cent. of water. On account of carelessness in manufacture it may contain hydrochloric, sulphuric, or sarcolactic acid and traces of metallic impurities. It is soluble in water and alcoholic solutions. The ordinary dose is from twenty minims to a half a drachm, diluted and sweetened.

Physiological Action.—Lactic acid is present in the stomach during the digestion of carbohydrates, especially during the first stage of gastric digestion. When in excess, it forms one variety of sour stomach, and causes pains in different parts of the body, headache, etc. It has been asserted that rheumatism is due to an excess of this acid in the system, and the fact that rheumatoid symptoms sometimes develop after partaking of sour milk or lactic acid seems to lend support to this view. Such patients are benefited by the use of alkaline treatment. Large amounts act as depressors to the nervous system and decrease the normal alkalinity of the blood, thus favoring myalgic and neuralgic attacks.

Therapy.—Locally, lactic acid, diluted ($\frac{1}{6}$) with water and glycerin, has been used in tuberculosis of the throat and larynx and in diphtheria and croup as a solvent of false membrane. In lupus or tubercular ulceration of the tongue it has been found very useful, as well as in lupus of the face, diluted (15 to 30 per cent.).

In dyspepsia, with deficient secretion, pepsin may be combined with lactic acid at meal-time. In the green diarrhœa of infancy, attributed by Hayem to a microbe, this agent well diluted (ʒj in a tumblerful of recently-boiled water, sweetened with white sugar, of which solution a teaspoonful may be given every half hour or hour, according to the case) is a very efficient remedy, controlling irritability of the stomach, relieving pain, and changing the character of the discharges. From theoretical considerations the use of lactic acid in diabetes mellitus was proposed by Cantani. Cases have been reported in which, conjoined with appropriate dietetic regimen, it appeared to favorably influence the disease

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Dose, ♏xx–ʒss.

Preparation.

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and lessen the quantity of sugar excreted. In other cases, again, it proved a failure.

The lactate of iron, or ferrous lactate, is in the form of greenish crystalline scales or crusts, and is used as a chalybeate tonic, being less astringent and constipating than other iron salts.

ACIDUM NITRICUM (U. S. P.).—Nitric Acid.

Preparation.

Acidum Nitricum Dilutum (U. S. P.).—Dilute Nitric Acid. *Dose*, ♏v–xx.

Pharmacology.—Nitric acid contains 69.4 of absolute nitric acid and 30.6 per cent. of water. The dilute acid contains 10 per cent. of absolute acid, and is made by adding 6 parts of water to 1 of nitric acid.

The nitrates of ammonium, lead, potassium, silver, and of sodium are officinal; also spirit of nitrous ether, bismuth subnitrate, nitrohydrochloric acid, and nitrohydrochloric acid dilute. The solutions of nitrate of iron and of nitrate of mercury are also officinal.

Physiological Action and Toxicology.—Introduced in a concentrated solution, nitric acid is a violent corrosive poison, and produces vomiting, pain, and distress, at once, followed by inflammation and sloughing of the mucous membrane of mouth and œsophagus. Alkalies, demulcents, and milk diet constitute the treatment.

Therapy.—Nitric acid is an oxidizing agent in the laboratory, and when applied in strong solution it has a decidedly caustic action, staining the skin yellow. It is the preferred caustic for venereal sores, warts, poisoned wounds, sloughing, and phagedæna. In uterine ulceration, prolapse of bowel, and hæmorrhoids, nitric acid is a useful application. Introduced into the system in small doses, well diluted, it acts as an astringent tonic, especially useful in cases of atonic dyspepsia, and in the uric-acid diathesis and oxaluria. In broken-down syphilitic subjects, or in chronic liver disease, nitric acid is a useful restorative.

A very valuable prescription, especially for the treatment of chronic syphilis, is as follows:—

℞ Acidi nitrici dil., ... ♏cc.
Tinct. bardanæ sem., ... f℥iij.
Tinct. xanthoxyli, ... f℥ij.
M. Sig.: Two teaspoonfuls in water three times a day.

In dilute solution (♏x or xx–℥j) it has been used in cases of phosphatic calculi, to wash out the bladder, and it may be used as an injection into sinuses connected with dead bone. A few drops of nitric acid to the ounce of water is an excellent stimulant application to indolent ulcers. In whooping-cough, or bronchial catarrh, it has been advocated, and in

hoarseness of public speakers a few drops in a glass of water afford relief. It is inadvisable to continue too long the administration of nitric acid, as, in that case, it excites gastro-intestinal catarrh. The same remark applies to the other mineral acids.

In many skin diseases, such as impetigo, lepra, acne, the addition of nitric acid to the bath has been found useful in addition to its internal administration.

Mistura Antidysenterica.—Hope's camphor mixture :—

℞ Acidi nitrici,*	f℥ss.
Tincturæ opii,	♏xx.
Aquæ camphoræ,	f℥iv.

M. Dose, a teaspoonful to a tablespoonful every hour or two, according to symptoms.

Dilute nitric acid will often remove chronic diarrhœa, and its efficacy may be increased by the addition of witch-hazel, thus :—

℞ Acidi nitrici dil.,	♏clx.
Ext. hamamelidis fl.,	f℥iij.
Syrup. aurantii,	f℥iv.

M. Sig.: From one to two teaspoonfuls in water three or four times a day.

Full doses of nitric acid every fourth or sixth hour have been found useful in intermittent fever. After the paroxysm has been broken up by quinine, nitric acid may be serviceably given in order to relieve inactivity of the liver and intestinal glands. Small doses of nitric acid are beneficial in aphthæ and ulcerative stomatitis.

Nitric acid reddens morphine, and probably decomposes it; and, therefore, should not be prescribed in solutions with this agent, as the rule. The nitrites have a decided lowering influence upon the temperature and circulation; they will be considered in connection with amyl nitrite.

ACIDUM NITROHYDROCHLORICUM (U. S. P.).—Nitrohydrochloric Acid.

Preparation.

Acidum Nitrohydrochloricum Dilutum (U. S. P.).—Dilute Nitrohydrochloric Acid. *Dose*, ♏v–xx.

This combination of nitric and hydrochloric acids (4 to 15) is officinal, the dilute form containing 4 parts of nitric acid, 15 of hydrochloric acid, and 76 parts of distilled water. It should be allowed to stand for two weeks after mixing, and kept in a cool place. The concentrated solution readily dissolves gold leaf when immersed in it; it is not used for medical purposes, the dilute form being preferable. It is supposed to have a special action upon the hepatic functions, and is a good tonic

* The original formula for this preparation called for nitrous acid, but, as commercial nitric acid usually contains some nitrous, it has become customary to order nitric acid.

and astringent. It has been applied with compresses in chronic liver disorders in a solution (f℥ss to a pint of water).

Symptoms of poisoning and methods of treatment same as given under Hydrochloric Acid.

ACIDUM OLEICUM (U. S. P.).—Oleic Acid.

Preparations.

Oleatum Hydrargyri (U. S. P.).—Oleate of Mercury, 10 per cent.
Oleatum Veratrinæ (U. S. P.).—Oleate of Veratrina, 2 per cent.

Pharmacology.—Oleic acid is an oily, yellowish, tasteless liquid, gradually becoming brown, rancid, and acid when exposed to the air. It is insoluble in water, but soluble in alcohol, ether, etc. Equal volumes of the acid and of alcohol, heated to 77° F., should give a clear solution, without allowing the appearance of free drops of oil upon the surface.

This, when freshly prepared, is a bland and unirritating application to the skin, and was brought forward as an addition to ointments and liniments to increase their penetrating power, but lanolin has now taken its place for this purpose. Lately, largely through the influence of the writings of the author, it has been much used in the manufacture of oleates, which are now produced in the form of true chemical compounds, instead of simple mixtures, as heretofore.

The following is a summary of the action of the oleates, from "Ointments and Oleates, especially in Diseases of the Skin"*:—

The Oleates.

Aconitine Oleate (U. S. P.).—Not very active. Can be used in neuralgia.

Atropine Oleate.—Not very active. Constitutional effects not produced except where large surfaces are anointed.

Aluminium Oleate.—Diluted one-half with lard or some fatty substance, it forms the ointment of the oleate of aluminium, which is decidedly astringent. It is useful in checking the muco-purulent discharges of dermatitis and eczema, and in chafing, or intertrigo, especially in infants and young children. In hyperidrosis and in bromidrosis it is very effective. This ointment is also a useful dressing to burns, foul ulcers, chilblains, and sinuses.

Arsenicum Oleate.—A valuable alterative and escharotic, but it must be used with caution. The oleate, when melted with lard or ointment base (1 to 4 or 1 to 9), forms the ointment of arsenicum oleate. This has little action upon a healthy skin, but when the epidermis has been removed, or on granulating surfaces, it produces inflammation and destroys the vitality of the tissues to a considerable depth. When well diluted, it exerts a most excellent alterative impression upon the integument; and also in ulcerating epithelioma, in lupus (after scraping), and in old scrofulous ulcers, this is of great utility. In sycosis, seborrhœa, and chronic eczema it is likewise of service. After scraping or puncturing the affected area, it can be used to destroy warts, corns, horns, condylomata, old granulations, and nævi. It may be advantageously combined with opium, belladonna,

*Second Edition. Philadelphia and London: F. A. Davis, Publisher. Physicians' and Students' Ready-Reference Series. 1890.

hyoscyamus, arnica, arrow-root, naphthol, etc. (For formulæ, see author's book on "Oleates.")

Bismuth Oleate.—Emollient and slightly astringent. In all pustular eruptions, in sycosis, it relieves the itching and often aborts the pustules. It allays irritation in erysipelas and sun-burn. In acne rosacea it relieves the inflammation, and in conjunction with scarification of the surface is curative. In acute eczema this oleate is considered indispensable in arresting the progress of the malady. Cracked and sore nipples are usually healed by the oleate of bismuth ointment (ʒj bismuth oleate to ʒvij of ung. aquæ rosæ).

Cadmium Oleate is stimulating and irritating. It has been used in chronic eczema with great infiltration, exuberant granulations, and enlarged glands, the strength of the ointment being adapted to each case.

Cocaine Oleate, in the form of a 6-per-cent. alkaloid, with equal parts of ointment or lanolin, has not answered expectations as a local anodyne or anæsthetic, but has been used with some benefit in pruritus pudendi and ani, or eczema marginatum.

Copper Oleate, in the form of 10- or 20-per-cent. ointment, has no visible effect upon the healthy skin, but penetrates deeply into the follicles, where it exerts a stimulating and antiseptic action. It is decidedly astringent to the broken skin or raw surface, reducing exuberant granulations, checking hæmorrhage, from irritable sores and old ulcers. Owing to its parasiticide action, it is the best remedy for the various forms of ringworm. In tinea versicolor, even in favus, it is equally effective in destroying the parasite without epilation. Copper oleate, melted and spread as a plaster, will very often cure warts, corns, bunions, and thickened conditions of the epidermis. The ointment above referred to is also useful in freckles and other discolorations of the skin. It is essential that the salt should be made from pure oleic acid, as otherwise the application may be accompanied by irritation or inflammation of the skin. The weaker ointment (gr. v–x to ℥j) should be first tried and the strength gradually increased.

Iron Oleate is a valuable styptic and astringent. The use of a weak ointment in the inflammatory form of eczema, in which the surface is raw and bleeding, is followed by good results; also in pustular eczema, sycosis, furuncles, and in scrofulous sores. Mixed with the oil of ergot or any bland oil, the iron oleate is of great advantage in dry seborrhœa and in patches of alopecia. The early stages of acne rosacea are often entirely relieved by the weak application of ointment of iron oleate. In ulcers caused by arsenical poisoning, this has given better results than any other remedy in the hands of the writer, especially with the addition of 1 per cent. of carbolic acid.

Lead Oleate, melted with equal parts of lard-oil, or lard, forms a cream-colored, semi-solid ointment, which is superior to Goulard's cerate or Hebra's litharge ointment. It allays irritation in papular or pustular eczema, and also in fissured eczema of the hands or feet. In hard and indurated papules, as in acne of the face, neck, and back, it is excellent in its effects. Thymol, naphthol, carbolic acid, oil of chamomile, or oil of cade may be combined with it, according to the case.

Manganese Oleate has been used (a 10- to 20-per-cent. solution in ointment) as a remedy in amenorrhœa and other uterine affections, applied with friction to the abdomen. Probably its asserted good effects are to be attributed to the massage rather than to any constitutional effect from the manganese, as there is no evidence of its absorption.

Mercuric Oleate.—The ointment of mercuric oleate (26.2 per cent.)* is a yellowish substance of fatty consistence. It is stimulating to the skin, and has a decided alterant action upon the glandular structures. In old eczema, with thickening of the skin, this two-fold action is very beneficial; also in papular and tubercular lesions, and infiltration attendant upon abscesses. In inflammation of the hair-follicles, sycosis, and scrofulodermata, it is quickly curative. Its bactericide action makes it valuable in all cases of parasitic invasion of the skin; and in the treatment of lousiness the addition of picrotoxin (gr. i–℥j) is

* Oleatum hydrargyri of the U. S. Pharmacopœia contains 10 per cent. of yellow oxide of mercury, with 90 per cent. of oleic acid.

advisable, in order to destroy the vitality of the nits. If it is desired to produce a constitutional impression, lanolin may be added, or mercurous oleate substituted. In fact, mercuric oleate is absorbed only very slowly. Large quantities have been applied to the surface without producing constitutional effects.

Mercurous Oleate.—This ointment contains a higher percentage of mercury than the preceding (41.6 per cent.); it is substituted when it is desired to make a more profound impression upon the structures of the skin, or to practice the inunction treatment of syphilitic affections, and for this is far superior to either the ordinary blue ointment or the mercuric oleate. In old spots of psoriasis and chronic plantar and palmar eczema it can be used alone, or combined with some form of tar or naphthol.

Morphine Oleate has only a feeble action upon the integument, and has no special advantage.

Nickel Oleate, in the form of ointment with some fatty base, has a very decided astringent action upon abraded surfaces. In the proportion of from 5 to 20 grains to the ounce of lard it acts well in epithelial ulcerations, old callous ulcers, or chronic eczemas.

Quinine Oleate has slight stimulant and antiseptic action, but has no special advantages.

Silver Oleate coagulates albumin, and, when sprinkled over sores, coats the surface and excludes the air; at the same time it stimulates granulations and cleans off the surface Dissolved in oleic acid and mixed with lard (5 to 60 grains to the ounce), it forms a dark-brown, pliable ointment, which may be applied in cases of erysipelas to keep the inflammation from spreading. In superficial lupus it sometimes lessens cell-infiltration and reduces active inflammation. In boils, carbuncles, eczema around the genitals or on the buttocks, especially if attended by irritation or itching, marked relief follows the application, either alone or combined with opium, belladonna, or hyoscyamus.

Strychnine Oleate has no special value as an ointment.

Tin Oleate.—The ointment (10 to 60 grains to the ounce) is a grayish-brown ointment, possessing some astringent and tonic action. It is of especial service in diseases of the nails, and in irritations of skin around the nails (agnail, etc.).

Veratrine Oleate is officinal in 2-per-cent. solution in ointment. It has decided counter-irritant and benumbing effects upon the skin, making it useful in some cases of neuralgia or tender spots.

Zinc Oleate is a fine, pearl-colored powder, soft and soap-like to the touch, is astringent in its effects, and can be used as a dusting-powder in hyperidrosis and bromidrosis. In local sweating of the axillæ, genitalia, hands or feet, especially when attended by maceration of the epidermis, this agent is very useful. Murrell, of London, has also used it in the sweating of phthisis, combined with thymol (1 to 500). Salicylic acid (3 per cent.) or French chalk may be added to it, for the treatment of local affections, such as comedo and acute vesicular eczema. In all such acute inflammatory affections it can be used with advantage, where greasy applications cannot be borne. It has also been used in gynæcology as an application to cancerous ulceration of the cervix uteri. Here it may be combined with iodoform (zinc oleate 1, iodoform 2 parts).

ACIDUM OXALICUM.—Oxalic Acid.

Not used in medicine, except as a test, or in solution to remove ink stains. It is an irritant poison, and is sometimes taken by mistake for Epsom salts. Its antidote is lime, chalk, or whitewash.

ACIDUM PHOSPHORICUM (U. S. P.).—Phosphoric Acid.

Preparations.

Acidum Phosphoricum Dilutum (U. S. P.).—Dilute Phosphoric Acid. *Dose*, ♏ii–xx.

The officinal phosphates are ammonia, iron, and soda.

The officinal hypophosphites are lime, iron, potassium, and soda.

Pharmacology.—Phosphoric acid in the solid form, glacial phosphoric acid (metaphosphoric acid), is not officinal in the present edition of the pharmacopœia on account of its unreliability. The officinal phosphoric acid is a colorless, odorless, syrupy liquid, containing only 50 per cent. of orthophosphoric acid. The dilute acid is only one-fifth of this strength.

Physiological Action.—Phosphoric acid, locally, is an irritant, and exerts some escharotic effect. When taken internally, well diluted, it aids nutrition and growth, as it is an essential element in all bony and vascular structures in the form of phosphates. It is also, like nitric acid, a stimulant to oxidation. It improves the appetite and the digestion, increases secretion, and is synergistic with the vegetable bitters.

Therapy.—In all debilitated conditions of the system, in anæmia, in the exhaustion of prolonged lactation, in bronchial catarrh in the aged, phosphoric acid is an excellent tonic; it is also useful in struma and wasting diseases. Its action being different from phosphorus in substance, it is less efficient than that drug in the treatment of neuralgic conditions.

Phosphoric acid is especially valuable as a tonic in the following formulæ:—

℞ Acidi phosphorici dil.,	f℥ss.
Tinct. nucis vomicæ,	♏cc.
Tinct. ferri chloridi,	f℥ij.
Syr. pruni virg.,	f℥iss.

M. Sig.: From one-half to one teaspoonful in a wine-glass of water, taken through a tube after meals.

℞ Acidi phosphorici dil.,	fʒiij.
Strychninæ sulph.,	gr. ss.
Glycerini,	fʒix.
Syr. aurantii,	f℥iiiss.

M. Sig.: One teaspoonful in wine-glass of water, taken through a tube after meals.

℞ Acidi phosphorici dil.,	fʒv.
Sodii hypophos.,	ʒij.
Elix. calisayæ,	f℥iiiss.

M. Sig.: One teaspoonful in water before meals.

Given before meals, phosphoric acid is beneficial in hyperacidity of the stomach, whether due to increased production of hydrochloric acid or the result of fermentative changes in the food. Phosphoric may reasonably be preferred to the other mineral acids in the treatment of typhoid fever when the predominant symptoms denote great nervous prostration.

The dilute solution may be applied as a stimulant to indolent ulcers, and it has been proposed to inject it into enlarged glands (lymphadenoma).

ACIDUM PICRICUM.—Picric Acid.

Dose, gr. ¼–ij.

Pharmacology.—Picric or carbazotic acid (trinitrophenol) is in the form of pale-yellow scales, soluble in water, and has a very bitter taste. Owing to its power of coagulating albumin, its watery solution forms a convenient test for albumin in the urine; it is also a test for peptones. It should be used as a confirmatory test in conjunction with the heat test and Heller's test with nitric acid.

Therapy.—The application five to ten times daily of a 6-per-cent. solution of picric acid has been found useful in erysipelas. The ammonium salt has been highly praised in the treatment of whooping-cough and malaria, the average dose being ½ grain four or five times daily. Picric acid should be used, either internally or externally, with caution, since it is apt to excite urticaria and other symptoms of systemic intoxication.

ACIDUM SALICYLICUM (U. S. P.).—**Salicylic Acid.**

Dose, gr. x–ʒj.

Preparations.—The officinal salicylates are of sodium, of lithium, and of physostigmine. Salicylic-acid ointment (not officinal) is made by incorporating the acid with lard or lanolin by the aid of gentle heat (10 per cent.).

Pharmacology.—Salicylic acid occurs as fine, white, needle-shaped crystals, soluble in 450 parts of cold or 14 parts of hot water; and in alcoholic solutions in 80 parts of chloroform, 60 parts of glycerin, and in 2 parts of olive-oil (by aid of heat). One ounce of sweet spirit of nitre will dissolve 16 grains of salicylic acid. The solution remains clear even upon the addition of water. Crystallized salicylic acid is pure and without odor; precipitated acid has a rather peculiar disagreeable taste; the sublimed acid is often pink-colored, and smells of phenol. Dialyzed salicylic acid is preferred. It is claimed that the salicylic acid made from oil of gaultheria is the best and purest form in which to prescribe it.

Physiological Action.—An antiseptic and antiferment, and prevents souring of beer, cider, or milk, or the putrefaction of urine. It is injurious only when used constantly and in relatively large doses. It is very irritating to mucous surfaces, and is not to be administered in pill, powder, or capsule, but always in solution, and preferably with the acetate of ammonium or potassium, citrate of potassium, or phosphate of ammonium, which increases its solubility in water, or it may be given in some syrup or elixir of orange.

Taken internally, it reduces abnormally high temperature. In health this action is not observed, although some observers assert that a slight reduction is produced. Sometimes headache, giddiness, and ringing in

the ears have been noticed, but usually no marked effect is seen upon either pulse or respiration. Toxic doses cause slowing of the breathing; and convulsions, nausea, burning in the throat, vomiting, and gastric irritability have been observed to occur, followed occasionally by albuminuria, hæmaturia, or almost complete stoppage of urine. This is a derivation from the normal action, for in ordinary cases it acts as a diuretic, with slight increase of elimination of the urates and urea. In acute nephritis it diminishes the quantity of the urine and increases the proportion of albumin. The treatment is that for an irritant poison; the stomach should be washed out with warm water, decoction of coffee administered, and the patient treated symptomatically. The effects rapidly pass off as the acid is carried out from the system by the urine, principally without change, partly also as salicin and salicyluric acid. Probably some also escapes in the sweat and saliva. After excessive doses the urine becomes olive-green in color, from the presence of indican and pyrocatechin. These substances result from the action of the pancreatic juice upon salicylic acid. A solution of chloride of iron strikes a violet color with urine which contains salicylic acid. In the body, the acid combines with glycocol in the liver and elsewhere, and becomes converted into salicyluric acid.

Therapy.—For external use salicylic acid may be combined with chalk as a dentifrice where there are carious teeth. A similar mixture may be used for the relief of fetid perspiration (feet or axilla), with talc or corn- or rice- flour. In gangrene, or sloughing cancer, it may be applied full strength or diluted. Dressings may be saturated with an alcoholic solution, and subsequently dried. In this way it may be used in the antiseptic method of wound treatment; it is not so powerful in this direction as carbolic acid, yet it has the great advantages of being odorless and free from danger of toxic symptoms following absorption. It is also used in solution as a substitute for carbolic acid in the details of the modern antiseptic method. (A solution can be made by adding 8 parts of borax to 100 parts of boiling water, and, when dissolved, adding 10 parts of salicylic acid, and filtering when cool. On account of its irritant action it is not a good application for diphtheria or croup.) A saturated solution of salicylic acid in collodion is a very effective application to corns and warts. Tincture of cannabis indica is often added, but it produces an unsightly stain without conferring any additional advantage. An ointment containing this substance is sometimes of benefit, especially in chronic eczema and in ulcerated lupus vulgaris. From 5 to 60 grains to the ounce of lard, lanolin, or other excipient will sometimes remove freckles. On account of its germicidal virtue it may be advantageously used in the treatment of tinea circinata.

It has, however, been found useful as a topical application in thrush and catarrhal stomatitis, in which conditions it acts as a local anodyne. It allays the burning pain of the erosions left after the vesicles have ruptured. The solution is made by dissolving 1 part of acid in sufficient alcohol and adding 250 parts of water. Salicylic-acid solutions have likewise proved of value in irrigation of the large intestine for dysentery. Acute intestinal catarrh has been treated in the same manner with very successful results. In the latter malady the internal use of the remedy may be conjoined.

Salicylic acid may also be employed in fetid bronchitis as an inhalation with a steam-atomizer, using half an ounce of borax in 17 fluidounces of boiling water, to which half an ounce of salicylic acid is to be added. The same solution can be used in catarrhal pneumonia, in phthisis, etc.

The following formulæ will be serviceable as local applications :—

℞ Acidi salicylici,	ʒij.
Bismuth. subnitrat.,	℥ss.
Pulv. zinci oleatis,	ʒij.

M. Sig.: Dust over the surface. Useful in excessive or fetid sweating and in seborrhœa oleosa.

℞ Acidi salicylici,	ʒss vel ʒj.
Ungt. hydrarg. nit.,	ʒiij.
Beta-naphthol,	gr. x.
Ungt. zinci oxidi benz.,	ʒv.

M. Sig.: Rub well into the surface several times a day. For fissured eczema of the palms of the hands and soles of the feet.

An excellent application for dry eczematous patches on the skin is :—

℞ Acidi salicylici,	gr. x vel ʒj.
Bismuth. subnitrat.,	
Amyli,	āā ʒij.
Adipis (dehydrat.),	f℥j.—M.

Internally, the use of salicylic acid in acute rheumatism (10- to 20-grain doses every hour until 1 or 2 drachms have been taken) for two days is generally followed by prompt relief. On account of its comparative insolubility, salicylic acid is now less used than the salicylate of sodium, which is given in the same doses. It is believed that the soda salt is rapidly converted into the original acid by the carbonic acid of the blood.

Salicylic acid approaches the character of a specific remedy in acute rheumatism. Its most marked effects are reduction of the articular swellings, the pain, and the fever. But it is not able to prevent the occurrence of heart trouble, or of relapse. It is a good practice, and perhaps shortens the absolute duration of the case, to reduce or abandon

the salicylic acid after it has produced its most notable results, and to replace or combine it with an alkali. It does not prevent hyperpyrexia, since that condition has been known to occur while this remedy was being administered. The virtue of the salicylic treatment is much less decided in chronic rheumatism, though stiffness and pain are relieved in a certain proportion of cases. In subjects who are much debilitated the salicylate of quinine may be employed, or, if anæmia be marked, the salicylate of iron. In muscular rheumatism salicylic acid will sometimes afford relief, and will often fail. The pain and swelling of rheumatoid arthritis are sometimes relieved and the progress of the disease arrested by the salicylate of sodium. The same salt is, in some instances, serviceable in gonorrhœal rheumatism. In acute articular gout and in irregular gouty manifestations good results have likewise attended the use of salicylic acid or the salicylate of sodium.

Salicylic acid, or its sodium salt, has been found useful in those affections so often associated with or dependent upon the rheumatic diathesis, as the various forms of neuralgia, especially migraine, trifacial neuralgia, and sciatica, chorea, tonsillitis, urticaria, and erythema nodosum. In sciatica, Ringer prefers it to any other remedy. Rheumatic iritis may also yield to its influence.

Salicylic acid has been successfully used as an anthelmintic. Tænia solium has been removed by five hourly doses of 8 grains each, preceded and followed by a dose of castor-oil. Round-worms and seat-worms are destroyed by the same agent, the latter by the local effect of an injection, the former by the internal use of the drug.

Salicylic acid may be given in 5-grain doses in order to purify the foul breath sometimes present in phthisis. Improvement has sometimes followed the administration of salicylic acid or its combination with sodium in diabetes. The same remedy is of service in diabetic neuralgia.

It is also employed for its antipyretic effect in typhoid fever, pneumonia, erysipelas, and phthisis, but it is regarded as especially serviceable in blood-poisoning and sapræmia, pyæmia, etc., and the eruptive fevers of children. In relapsing fever it is said to render the relapse shorter and of less severity. It promptly checks the yeasty vomiting dependent upon the growth of sarcina ventriculi. Sometimes serious disturbances of the circulation occur from medicinal doses in cases of fever. It is very probable that in some of these cases the results are attributable to impurities in the salicylic acid. Urticaria, erythema, and vesicular cutaneous symptoms have been noticed after its administration. In exceptional cases the exhibition of salicylic acid is followed by hæmorrhage, usually from the gums or nose. The soda salt is believed to be free from this objection.

The granular effervescent form is a good one in which to administer the salicylates, or they may be given in effervescent draughts, or in combination like this :—

℞ Sodii salicylatis, ... ʒij.
Tinct. lavandulæ comp., ... fʒiv.
Syrup. aurantii, ... f℥iiss.
M. Sig.: Give a tablespoonful every three (or four) hours for acute rheumatism.

The following prescriptions may likewise be recommended as beneficial combinations in acute rheumatism, gout, and neuralgia :—

℞ Acidi salicylici, ... ʒij.
Spt. ætheris nitrosi, ... f℥iv.
Tinct. cardamom. co., ... f℥j.
M. Sig.: Two teaspoonfuls in water every two hours.

℞ Acidi salicylici, ... gr. cc.
Liq. ammon. acetatis,
Aquæ camphoræ,
Spt. ætheris nitrosi, ... ad f℥ij.
M. Sig.: A teaspoonful in water every two or three hours.

The appended formula is serviceable in chronic rheumatism and gout :—

℞ Acidi salicylici, ... ʒiij.
Elix. cascaræ sagradæ, ... f℥vj.
M. Sig.: A tablespoonful in water two or three times a day.

ACIDUM SULPHURICUM (U. S. P.).—Sulphuric Acid.

Preparations.

Acidum Sulphuricum Dilutum (U. S. P.).—Ten-per-cent. Sulphuric Acid. *Dose*, ♏v–xv.

Acidum Sulphuricum Aromaticum (U. S. P.).—About 20 per cent., with tinct. ginger 4.5, oil of cinnamon 0.1, and alcohol to make 100 parts. Elixir of Vitriol. *Dose*, ♏x–xx.

Pharmacology.—The officinal acid is chemically pure, of 1.840 specific gravity, containing not less than 96 per cent. of absolute sulphuric acid (hydrogen sulphate) or 80 per cent. of anhydride. It must be colorless, and should be kept in glass-stoppered bottles; it is without odor, and is of an oily consistence. The commercial acid (oil of vitriol) contains various impurities,—arsenic, lead, nitric acid, etc.

Physiological Action and Toxicology.—Sulphuric acid in full strength chars animal substances and has a strong affinity for water. Applied to the skin, it acts as a caustic, re-dissolving the coagulum formed and penetrating deeply, turning the surface black. When taken internally, the lips and other parts of the mouth are blackened, and symptoms of corrosive poison are produced; there is intense pain, with efforts at vomiting. Collapse and death may rapidly ensue from the intense congestion of the œsophagus and stomach, or it may occur secondarily from the resulting

strictures of the œsophagus. The stomach-pump should be used with extreme care on account of the danger of tearing the softened mucous membrane or rupturing the stomach. Alkalies should be given with milk or soap-water, and morphine given hypodermatically to relieve pain, combined with atropine as a cardiac stimulant. Oil, white of eggs, and magnesia are also appropriate. Demulcents and appropriate treatment for the succeeding inflammation will be needed. Sulphuric acid is sometimes thrown upon a person, especially in the face. In such a case water is freely used to wash off the excess of acid, and an alkaline wash applied; to relieve pain opium internally will be needed. The subsequent treatment is that of an ordinary burn.

Therapy.—On account of the pain following its application, sulphuric acid is not much used as a caustic, although it is an efficient destroyer of tissue. Velpeau used it in cancer, and Ricord for chancres, the acid being mixed with some absorbing substance like sawdust or charcoal. In caries and necrosis, and suppurating cavities or sinuses, it may either be applied upon a glass rod or on lint, diluted with 4 to 6 parts of water.

Internally, dilute sulphuric acid acts as an astringent and antiseptic. The elixir of vitriol is the preferred form for the night-sweats of phthisis, and in some cases of diarrhœa. Sulphuric acid, with water, sweetened so as to make a pleasant drink, is a valuable prophylactic against lead poisoning when used by operatives in lead-works, and also has been found to be a preventive of attacks of Asiatic cholera, when taken regularly during the prevalence of an epidemic:—

℞ Acid. sulphuricum diluti,		f℈iiss.
Tr. opii deodoratæ,		f℈j
Elixir,		f℥j.
Aquæ,	q.s. ad	f℥iv.

M. Sig.: Take a tablespoonful, for dysentery, every hour or two. Watch with care the action of the opium.

This acid is very commonly given in typhoid fever. It may be preferred to hydrochloric acid when the diarrhœa is excessive. Lead colic is relieved by the use of sulphuric acid, and the constipation of lead poisoning is effectually treated by a combination of dilute sulphuric acid, sulphate of quinine, and sulphate of magnesia. On account of its astringent properties it is beneficial in hæmorrhage from the uterus, stomach, or intestinal canal, and in purpura. The following prescriptions have been found beneficial:—

℞ Acid. sulph. aromat.,	f℈ij.
Ext. hamamelidis fl.,	f℥ij.
Ext. ergotæ fl.,	f℥ij.

M. Sig.: Two teaspoonfuls in water every two or three hours. Use especially in hæmorrhage from lungs, stomach, or womb.

℞ Acidi sulph. aromat.,	. . . .	f℥ss.
Magnesii sulph.,	. . . .	℥ij.
Spts. chloroformi,	. . . .	fℨiij.
Inf. rosæ gallicæ,	. . . .	ad f℥viij.

M. Sig.: A tablespoonful every three hours. Useful in hæmorrhage from rectum and constipation.

℞ Acidi sulph. dil.,	. . . .	f℥ss.
Quininæ sulph.,	. . . .	gr. xij.
Tinct. opii, .	. . . .	fℨij.
Syrupi et aquæ, .	. . . .	ad f℥iij.

M. Sig.: A teaspoonful in water every four hours in enteric fever with tendency to diarrhœa and sweating. Also useful in sweating of phthisis.

Acidi Sulphurici Liquor Halleri (Haller's acid drops)—not officinal—is a mixture of equal parts, by weight, of acid and alcohol, gradually added with constant stirring, taking care that the temperature of the mixture does not get so high as to vaporize the alcohol. It contains ether, alcohol, sulphuric acid and sulpho-ethylic acid, and is used for the same purposes as the aromatic acid, in about half the dose, on account of the larger amount of acid.

Acidum Sulphovinicum, or ethyl-sulphuric acid, is prepared by adding sulphuric acid to alcohol. It is freely soluble in alcohol, and mixes with water (1 or 2 parts) without losing its oily character. It is a yellowish liquid, with slightly astringent taste, and is neutral in reaction. The ethyl sulphates are crystallizable and soluble in water. The ethyl-sulphate (or sulphovinate) of sodium has been used as a saline cathartic. Ethyl-sulphuric acid is an example of an acid ether, and is a solvent for camphor (25 per cent.), iodoform (3 per cent.), sulphur, naphthalin, chrysarobin, etc., and can be used as a vehicle for these remedies in the treatment of skin diseases.

ACIDUM SULPHUROSUM (U. S. P.).—Sulphurous Acid.

Dose, ♏v–fℨj, well diluted.

Preparations.—In combination with a base, sulphurous acid makes sulphites. Of its salts, the following are officinal: Sulphite of potassium, of magnesium, and of sodium; also, bisulphite of sodium and hyposulphite of sodium.

Pharmacology.—Sulphurous-acid gas absorbed by water ($3\frac{1}{2}$ parts in 100) forms the officinal acid. It has the odor of burning sulphur, and a sour, sulphurous, somewhat astringent taste.

Physiological Action.—This acid and its salts are very destructive to low forms of animal and vegetable life, owing to their affinity for oxygen. It is not well borne by the stomach, and should be given freely diluted with water, as its taste and odor are very unpleasant. Locally, it does not excite much irritation.

Therapy.—As a local antiseptic or bactericide, sulphurous acid is highly prized in those forms of skin disease caused by parasitic invasion, such as tinea tonsurans and tinea versicolor. It may be effectively used in tinea favosa by the simple device of Dr. Schuster. A net of strings is stretched across the lower third of a card-board box, which fits to the head and can be closed by a lid of the same material. A saucer containing burning sulphur is laid upon the net of strings and the box covered. The patient must sit still for half an hour. An abundance of sulphurous-acid gas is generated, the sulphur ceasing to burn, of course, as soon as all the oxygen is exhausted. In various forms of sore throat it is useful, but particularly in diphtheria, where it can be used topically and also taken internally.

It is beneficially applied to unhealthy or sloughing wounds or ulcers. A drachm or two of the officinal acid to the ounce of water, or water and glycerin, is of service in chilblains and chapped hands. Sulphurous acid, as Ringer points out, may be used in such a manner as to cure scabies with the utmost rapidity. This method consists in exposing the patient, his head excepted, to the influence of sulphurous-acid gas, generated by burning 12 drachms of sulphur in a suitable closed apparatus. The clothes should be, at the same time, put in boiling water. Dr. Dewar recommends equal parts of sulphurous acid and of water as an efficient dressing in erysipelas.

In fermentation of food in the stomach, flatulent dyspepsia with sour stomach, pyrosis, dilated stomach, etc., sulphurous acid has been recommended. In typhoid fever it has also been used, and, it is asserted, with success, and may be tried in measles, scarlatina, and small-pox. In some bronchial affections, catarrh, whooping-cough, dilated bronchial tubes, it may be inhaled with steam-atomizer. It is also of great service in many skin affections, such as urticaria and purpura, after other methods have failed.

The author would recommend the following formulæ for the diseases just referred to:—

℞ Acidi sulphurosi,
Syrup. zingiberis, ... āā f℥ij.
M. Sig.: From one to two teaspoonfuls in water three times a day.

℞ Acidi sulphurosi,
Ext. ergotæ fl.,
Syrup. aurantii, ... āā f℥j.
M. Sig.: Two teaspoonfuls in water three or four times a day.

The sulphites and hyposulphites are employed to fulfill the same indications. The administration of the sulphites in pyæmia was advocated by Polli, but later clinical observers have not been able to obtain

the good results that he promised. The sulphides will be considered under the head of Sulphur.

ACIDUM TANNICUM (U. S. P.).—**Tannic Acid (Tannin).**
Dose, gr. i–xx.

Preparations.

Unguentum Acidi Tannici (U. S. P.) contains 10 per cent. tannic acid.
Trochisci Acidi Tannici (U. S. P.), each 1 grain.
Collodium Stypticum (U. S. P.).—Styptic collodion consists of 20 parts tannic acid 5 of alcohol, 20 stronger ether, 55 of collodion. For external use as an astringent.

Pharmacology.—Tannic acid is a common constituent of vegetable organisms, especially those noted for astringency, as oak-bark. Galls contain about 50 per cent. of tannic acid, which can be obtained by exposing powdered galls to dampness, and afterward dissolving out the tannic acid with the aid of ether. It occurs in light-yellowish scales, soluble in 16 parts of cold water, slightly soluble in alcohol. It is likewise soluble in glycerin. It coagulates albumin and gelatin, and strikes a black color with preparations containing iron. Solutions containing tannic acid (infusion of black tea or coffee) are antidotes for poisoning by some metallic salts, and especially antimony or tartar emetic, and the alkaloids.

Physiological Action.—Tannic acid, when locally applied, has an astringent action upon the tissues owing to its affinity for albumin. Internally, it acts as a weak acid upon the digestive tract, but when its chemical affinities are satisfied by combination with a base or neutralizing it with albumin it is no longer capable of precipitating albumin, and therefore no longer exercises an astringent action upon the parts with which it comes in contact. Hence, according to Stockman, it can exert little, if any, action upon the vascular system, and, as it is not excreted by the bronchial mucous membrane, very little or none upon the flow of the bronchial secretions. With regard to its action upon the kidneys, as it is excreted principally by this channel, it is conceivable that it may have some influence in diminishing albuminuria, although even this he regards as doubtful. Lewin recommends the administration of tannic acid in the form of an albuminate, which is free from irritation and is more readily absorbed (tannic acid, 2 parts; water, 90; mix well, and add white of egg, 10 parts). Internally, tannic acid is given in doses from 1 to 20 grains.

Therapy.—As a local astringent tannic acid heads the list. A combination of iodoform and tannic acid (2 to 1), finely powdered, is a good dusting-powder for moist eruptions, some forms of eczema, and for insufflation into the nose to reduce secretion in catarrh. After the severity of the inflammation has somewhat subsided, the glycerite of tannin is a

good application in acute eczema. It may be applied twice daily, and allays the stinging pain and itching. A solution of tannic acid in glycerin (1 to 4) is a good topical application to tonsillitis or pharyngitis. It may also be used as a spray, properly diluted, in hæmoptysis. For disorders of the lower bowel, ulcers, fissures, hæmorrhoids, prolapsus, and to expel thread-worms, a solution may be injected, or suppositories used, each containing 3 to 5 grains, with cacao-butter or starch. A solution of tannic acid is useful in cases of leucorrhœa, and the glycerite, or iodoform-tannin, is an excellent application for catarrhal inflammation of the cervix uteri.

Even in carcinoma uteri, the glycerite of tannic acid is efficient in moderating discharge and allaying odor. Its virtue may be assisted by combining it with the glycerite of carbolic acid. In gonorrhœa, after the acute stage has passed off, tannic acid is a useful medicament. In men it may be administered, dissolved in water, as a urethral injection. In women, a watery solution may be used as a vaginal injection, or the vagina may be packed with tannin. Solutions of tannic acid may also be employed for the purpose of hardening tender nipples and tender feet. A lotion of tannic acid is frequently of service in herpes. It is useful in phagedenic ulcers and alopecia circumscripta. Made into a pomade, it has been found of benefit in dandruff. Ringer recommends the glycerite of tannic acid in otorrhœa, not, however, during the acute stage, but after this has been relieved and but a moderate discharge is left. The remedy is more beneficial when the membrana tympani is intact. The canal is filled with the solution, which is retained by cotton-wool.

With alkaloids, tannic acid generally forms insoluble compounds; it should not, therefore, be prescribed with preparations containing salts of quinine, strychnine, etc.

Notwithstanding the chemical arguments urged by Dr. Stokman, tannic acid has long been successfully administered as an astringent remedy. As, however, it enters the blood under the form of gallic acid, its remote effects are, in reality, due to the latter acid. Tannic acid is preferably employed as a local application, gallic acid as a systemic remedy. The therapeutical uses of gallic acid have been already described, and need not be here repeated.

ACIDUM TARTARICUM (U. S. P.).—Tartaric Acid.

Dose, gr. v–xx.

Preparations.—The officinal tartrates are tartrate of antimony and potassium (tartar emetic), of iron and ammonia, of iron and potassium, of potassium, of potassium and sodium (Rochelle salt), and bitartrate of potassium (cream of tartar). Seidlitz powder, or **pulvis effervescens**

compositus (U. S. P.), is dispensed in two small papers, a blue one containing 2 drachms of the tartrate of potassium and sodium with 40 grains of bicarbonate of sodium, and a white one containing 35 grains of tartaric acid. When administered these are separately dissolved, each in about 2 ounces of water, and the two solutions mixed and drunk while effervescing. A slice of lemon improves the flavor of the dose.

Pharmacology and Physiological Action.—Tartaric acid is obtained by the decomposition of cream of tartar (potassium bitartrate) found in old wine-casks. It is laxative and slightly diuretic. It reduces the alkalinity of the blood and makes the urine acid. In larger doses it is an irritant; indeed, in its effects it resembles oxalic acid, and the morbid appearances are also very much the same. The symptoms are best relieved by demulcents, the alkalies, magnesia, chalk, soap, milk, etc.

Therapy.—Certain of the tartrates are used as laxatives, the tartrate of magnesium affording a good substitute for the citrate. Rochelle salt, in ½-ounce doses, before breakfast, is a good remedy for habitual constipation. Bitartrate of potassium (in doses of gr. x–xx) exerts a decided diuretic action, and in combination with washed sulphur (1 to 2) it forms an excellent laxative remedy for hæmorrhoids.

The combination of diuretic and cathartic virtues renders the bitartrate of potassium very useful in the treatment of chronic Bright's disease. It relieves œdema and delays the manifestation of uræmia. For a similar reason it is useful in ascites. The tartrate of potassium, or Rochelle salt, proves of utility in hepatic indigestion accompanied by an excess of uric acid in the urine.

ACIDUM TRICHLORACETICUM.—Trichloracetic Acid.

Pharmacology and Therapy.—This acid, a crystalline and deliquescent substance, readily soluble in water, is an efficacious caustic and astringent. It has been successfully employed in the removal of enlarged tonsils, hypertrophied follicles of the pharynx, and polypoid excrescences. Its action can be more strictly limited than that of some other caustics, but it is too slow for use when large masses of tissue are to be destroyed. It can be applied to the pharynx without any previous anæsthetization. The nares should first be touched with a 10-per-cent., and the larynx with a 20-per-cent., solution of cocaine. It is notable for the dryness of the eschar which it produces. Trichloracetic acid is a serviceable application to warts, vascular nævi, pigment patches, and indolent ulcers. This substance is also recommended as a good test for albumin. A few drops of a saturated solution or a crystal of the acid are added to the suspected fluid, and a turbid line immediately forms if albumin be present.

ACONITUM (U. S. P.).—**Aconite.** (Monkshood.)

Preparations.

Abstractum Aconiti (U. S. P.).—Abstract of Aconite. *Dose*, gr. ½–j.
Extractum Aconiti (U. S. P.).—Extract of Aconite. *Dose*, gr. ¼–½.
Extractum Aconiti Fluidum (U. S. P.).—Fluid Extract of Aconite. *Dose*, ♏$\frac{1}{10}$–j.
Tinctura Aconiti (U. S. P.).—Tincture of Aconite (40 per cent.). *Dose*, ♏i–v.

Pharmacology.—The tuberous root of Aconitum napellus (Ranunculaceæ) is a perennial plant indigenous to Europe, but sometimes cultivated here in gardens for its ornamental spike of blue flowers. All parts of the plant are poisonous, but the active principle, **Aconitine** (not officinal), exists in greater proportion in the root. (Napelline is probably only a weaker aconitine.) All the species of aconitum are more or less virulently active, but A. napellus is the only officinal one. The root of aconite in winter-time has been dug up in the garden and eaten in mistake for horse-radish, with fatal consequences. It is only necessary to be aware of this liability in order to effectually guard against the error. The aconite-root is premorse, and is not tapering throughout its length, as the root of armoracia is; it is also of a brown color, and when scraped does not give out the irritating vapor that is so characteristic of the latter. Poisoning in this way apparently could only occur as the result of grossest carelessness or of criminal intent.

Physiological Action.—The effects of aconite are those of its active principle, aconitine. It should be mentioned here, in explanation of the difference in effect from different specimens of aconite, that the alkaloidal strength and the physiological activity of the plant are much affected by circumstances of its growth, the wild varieties being more poisonous than the cultivated. In this way the well-known differences between the activity of different kinds of aconitine are comprehensible. Murrell has called attention to the fact that the English drug is seventeen times stronger than the German, while the French is variable, but generally between these; the crystalline variety (Duquesnel's or Merck's aconitine) is therefore to be preferred when prescribing, on account of its uniform strength.

Poisoning.—Applied to the skin or mucous surface, aconite first is slightly irritant, but this is soon followed by numbness, which may be accompanied by tingling sensations. If a bottle containing aconitine be held to the nose, painful irritation of nose and eyes results. In relatively large doses death occurs very promptly, and, if given hypodermically, the fatal result may follow in less than a minute, according to Wood. It is destructive to all forms of animal and vegetable life; sometimes very small doses produce very serious symptoms. A case of very marked impression from a quantity equal to 3 minims of the tincture

has been reported by Woodbury,* in which vomiting, loss of power of extremities with paræsthesia and numbness, loss of sight, mild delirium, weak pulse, and threatened stupor and collapse occurred, life being saved apparently only by very prompt and vigorous treatment. The first symptom observed in a case of poisoning is burning or tingling in the mouth and throat, soon extending to the extremities, and sometimes over the whole body. The surface of the extremities is cool or clammy and numb, but at the same time the patients complain that they feel as if the limbs were flayed. Sight may be lost and hearing dulled, but ordinarily the intellect remains clear until the last. Convulsions occur occasionally. The pulse becomes weak and variable; slight exertion may bring on a fatal syncope. The muscular strength is early affected, so that the patient is unable to stand. Owing to the lowering of the blood-pressure and the dilatation of the arterioles caused by the aconite, the heat of the body is at first brought, with the increased blood-flow, to the surface, and there the blood loses its heat by radiation and the temperature of the interior of the body is quickly lowered. The depression is accompanied by increase of perspiration, which still further reduces temperature. This occurs more obviously when there is pyrexia present than when the temperature is normal to begin with. Death results from failure of respiration generally, but it may occur suddenly from syncope, as already stated. Aconite applied locally first paralyzes the sensory nerves, beginning with the end-organs and ascending the trunk to the centre. The motor nerves are next affected. The reflex function of the cord is impaired. Uncertainty still exists, however, concerning the mode and order in which aconite affects the different portions of the nervous system. Ringer concludes, upon the basis of his and Dr. Murrell's experiments, that aconitine paralyzes all nitrogenous tissues, abolishing the functions, first, of the sensori-perceptive centre, acting next upon the nerves, and, finally, upon the muscles. Similarly, first the ganglia of the heart are attacked, next its nerves, and lastly its muscular structure.

Antidotes.—The antidotes to aconite are tannic acid, astringent infusions, alcohol, and ammonia. Digitalis appears to be the physiological antagonist to counteract the depressant effect upon the heart, or tincture of strophanthus may be substituted. The hypodermic injection of atropine also acts in the same manner. Nitrite-of-amyl inhalations, administered freely, appeared to save life in Dr. Elliott's case. The patient should be kept in a recumbent position. The stomach-pump, artificial respirations, ether or alcohol and tincture of digitalis hypodermatically, and a hot pack may all come in requisition; even faradization over the epigastrium and cardiac region might be useful.

* Proceedings College of Physicians of Philadelphia. Third series, vol. x, p. 450.

Therapy.—Locally, the benumbing effects of aconite have been utilized in the treatment of neuralgia, the best combination, probably, being the Baltimore liniment, or the *Linimentum Aconiti et Chloroformi* (N. F.) :—

℞ Tr. aconiti,
Chloroformi, ... āā f℥ij.
Liniment. saponis, ... q. s. ad f℥iij.

M. Sig.: Poison. For external use. To be applied along the course of the affected nerve.

The oleate of aconitine has also been used (2 per cent.) with asserted good results for this purpose. An ointment of aconitine is officinal in the British Pharmacopœia. This preparation contains 8 grains to the ounce of lard, the aconitine being dissolved in ½ fluidrachm of rectified spirit before being rubbed up with the fat. Aconitine ointment will often assuage the pain of chronic rheumatism, gout, and myalgia. It serves the same purpose, also, in herpes zoster, but care must be taken, in this affection, not to apply it to the abrasions produced by rupture of the vesicles. The same ointment also affords relief in neuralgia of the skin, paræsthesia, or pruritus, papular eczema, and prurigo. It must never be placed upon a raw surface.

Its control over the circulation places aconite in the first rank in the treatment of the fever process, but in order to get the best results it should be given in fractional doses (every ten, fifteen, or twenty minutes give a teaspoonful of water from a tumbler in which a few minims of the tincture have been dropped). This is invaluable in the treatment of the ephemeral fevers of childhood, and hyperpyrexia attendant upon the exanthemata. In adults, the results are also very positive; so that aconite has almost entirely taken the place of the lancet in the antiphlogistic treatment.

In the early stage of inflammatory processes—pneumonia, pleurisy, pericarditis, peritonitis, erysipelas, rheumatism, meningitis—and in children's diseases, it modifies materially the severity of the symptoms, reduces temperature, and moistens the skin. Aconite serves a useful purpose in acute congestion of the brain. In spasmodic croup, aconite relieves the dyspnœa within a few hours. Asthma, especially in children, and preceded by coryza, is generally benefited by the use of this remedy. Ringer states that a drop of the tincture every hour is useful in acute gonorrhœa. In coryza and quinsy, or crescent tonsillitis, it is highly prized for its influence in shortening the course of the disease; and it has also been given to abort or prevent urethral fever after the use of instruments. It affords prompt relief in congestive dysmenorrhœa. In facial neuralgia, the extract or abstract may be given internally, in combination with quinine and a carminative, viz.:—

℞ Abstracti aconiti,	. . . .	gr. iv.
Quininæ bisulphat.,	. . . .	ʒj.
Piperin.,	. . . .	gr. v.

Div. in pil. no. xx.

Sig.: Give one every two hours until relieved, and then one every four hours as long as needed.

In migraine, or sick-headache, it may be combined with cannabis indica :—

℞ Tr. aconiti,	. . . .	ℳij.
Tr. cannabis indicæ,	. . . .	ℳxv.
Tr. cardamom. co.,	. . . . q. s. ad	fʒj.—M.

For one dose, to be repeated every hour, or two hours, until patient is relieved.

Aconitine should never be given, even in the smallest dose, where there is a weak or fatty heart. It is used by Gubler in the treatment of facial neuralgia, and Seguin also advocates the crystallized aconitine in trigeminal neuralgia, in doses of $\frac{1}{300}$ or $\frac{1}{250}$ grain, to begin with, repeated cautiously, and gradually increased.

In nervous palpitation and overaction in a heart somewhat hypertrophied, and in the tobacco-heart, aconite cautiously used gives much relief.

ADEPS (U. S. P.).—Lard.

Preparations.

Adeps Benzoinatus (U. S. P.).—Benzoinated Lard (benzoin, 2 per cent.).
Oleum Adipis (U. S. P.).—Lard-oil.
Adeps Dehydratus.—Purified, dehydrated Lard (for ointments).

Pharmacology.—Lard is the prepared internal fat of the abdomen of Sus scrofa, Linné (class, Mammalia; order, Pachydermata), purified by washing with water, melting and straining. The specific gravity of lard is about 0.938. It is entirely soluble in ether, benzine, and disulphide of carbon. It melts at or near 95° F. to a clear, colorless liquid. It consists chemically of 62 per cent. of olein, or fluid fat, and 38 per cent. of the hard fats, palmitin and stearin. The olein may be separated by pressure, or by boiling alcohol. The salt with which it is frequently impregnated may be removed by boiling the lard with twice its weight of water. The tendency to rancidity may also be overcome by digesting the lard with beta-naphthol or poplar-buds. As a convenient animal fat, it is largely used in pharmacy as the basis of ointments and cerates; and in domestic practice it is universally employed as a lubricant. By the addition of benzoin the lard is prevented from becoming rancid, and an agreeable odor is imparted to it; dehydrated lard is preferred where the presence of water is considered objectionable. Lard-oil is sometimes used for illuminating purposes, and can be administered, in cases of corrosive poisoning, as an antidote, except where phosphorus or carbolic

acid has been swallowed. Lard is an article of food, or, more correctly, is largely employed in preparing other articles of food.

Therapy.—Lard has more penetrating power than petrolatum or vaseline, and active agents (such as mercury, or the alkaloids) can be combined with it for administration by inunction. Washed lard, beaten up with an equal quantity of lime-water, and a few drops of oil of bitter almonds, thymol, or of carbolic acid added, makes an elegant substitute for Carron oil as a dressing for burns, or for some acute inflammations of the skin. Stiffened with a little yellow wax, it forms the simple ointment of the pharmacopœia. This preparation is well adapted to fulfill the general indications of a fat, and to serve as an excipient for more active ingredients. When the secretory functions of the skin are suppressed, inunction with lard serves as a partial substitute for the natural secretion, softens the hard tissue, and reduces its heat. It sheaths the surface, and prevents the contact of the atmospheric air with its floating germs. It lessens or prevents the effect of irritant discharges. Lard softens and removes scabs. Simple ointment relieves the intense heat of the skin and itching in scarlatina. At the same time it assists in reducing the pulse-rate and temperature of the body. Inunction is likewise of value in measles.

ADHATODA JUSTICIA.*—**Adhatoda vasica, A. gendarussa,** or **A. pubescens.**

Pharmacology and Physiological Action.—The leaves of this plant (belonging to the Acanthaceæ, indigenous to India and neighboring islands) have been used with asserted benefit in pulmonary and catarrhal affections. It contains an alkaloid, **Vasicine,** combined with adhatodic acid. Hooper found it poisonous, when used in infusion, to flies, frogs, and all the smaller organisms, but harmless to large animals.

Therapy.—In asthma, 10-grain doses of the powdered leaves, given three times daily, afford great relief, the patient being also permitted to smoke the leaves in a pipe, or to inhale the smoke. On account of its bactericide properties, Dr. H. H. Rusby has recommended its use in diphtheria, and it has been suggested that it might also be efficient in typhoid fever, and by inhalation of the spray from the atomizer in cases of phthisis and fetid bronchitis. It is probable that it might also be useful in infectious dyspepsia due to abnormal fermentation of food in the stomach.

ADONIS VERNALIS.—**False Hellebore** (Pheasant's Eye).

Preparation.

Adonidin.—Dose, gr. $\frac{1}{20}$–$\frac{1}{5}$.

* Annual of the Universal Medical Sciences, 1890, vol. v, p. A-7.

Pharmacology.—Adonis is a perennial herb (belonging to the Ranunculaceæ), indigenous to Europe, having bright, showy flowers. There are two species, the A. vernalis, flowering in May, and the A. autumnalis, flowering in September; the former has yellow, the latter red, flowers.

Physiological Action.—The active principle, **adonidin,** appears to be a glucoside (although it has been asserted that this is not a simple but a compound body, containing picro-adonidin, a glucoside, and other undetermined substances). Whether used, as the peasants of Russia are said to be in the habit of doing, as an infusion, the fluid extract, or in the form of adonidin, it acts upon the heart as a stimulant or cardiac tonic, resembling in its action digitalis or strophanthus. According to Hare, it increases the arterial tension and in large doses causes diastolic arrest of the heart. In large doses it paralyzes both the heart and the blood-vessels.

It is claimed that, in moderate doses, adonidin is devoid of danger from cumulative effect, and that it agrees with the digestive organs. Huchard, however, found in some cases that it caused vomiting or diarrhœa. In a case in which three grains of adonidin were taken by mistake, vomiting and diarrhœa were prominent symptoms. In accordance with the observation that it increases arterial pressure, there is an increased flow of urine, but adonidin is said to have no effect upon the secreting structure of the kidneys.

Therapy.—Internally in cases of mitral or aortic regurgitation it is claimed to be of great value. In functional irregularity of the heart, Da Costa has found much benefit from adonidin (in doses of gr. $\frac{1}{20}$ to $\frac{1}{8}$ thrice daily). In cardiac asthma it also affords relief to the dyspnœa. The fluid extract (normal) is a good preparation in doses of ♏j or ij cautiously increased.

ÆSCULUS HIPPOCASTANUM.—Horse-Chestnut.

Pharmacology and Therapy.—This is an ornamental shade-tree (belonging to the Sapindaceæ), coming originally from Tartary. The bark is astringent and antiseptic, and has been used as a substitute for cinchona-bark. The fluid extract has been administered in malarial disorders and in neuralgic affections in doses of ♏xx–f℥j.

ÆTHER (U. S. P.).—Ether.

Preparations.

Æther Fortior (U. S. P.).—Stronger Ether, consisting of 94 per cent. of ethyl oxide and 6 per cent. of alcohol. Anæsthetic.

Oleum Æthereum (U. S. P.).—Equal parts Stronger Ether and heavy Oil of Wine.

Spiritus Ætheris (U. S. P.).—Spirit of Ether (stronger ether 30, alcohol 70 parts).

Spiritus Ætheris Compositus (U. S. P.).—Compound Spirit of Ether, or Hoffman's Anodyne (composed of stronger ether 30, alcohol 67, ol. æthereum 3 parts). *Dose,* f℥ss–ij.

Spiritus Ætheris Nitrosi (U. S. P.).—Spirit of Nitrous Ether. *Dose,* f℥ss–j.

Pharmacology.—Ordinary ether represents only 74 per cent. of oxide of ethyl and 26 per cent. of alcohol, containing a little water. For the purpose of producing anæsthesia by inhalation for surgical operations, the stronger ether only is suitable. It is a thin, very diffusive, clear and colorless liquid, with a refreshing, characteristic odor, a burning and sweetish taste, after-taste slightly bitter, with a neutral reaction. It is soluble in all proportions in alcohol, chloroform, benzol, benzin, fixed and volatile oils; dissolves in eight times its volume of water at 59° F., and it boils at 98.6° F. It is very inflammable, and its vapor, mixed with air and ignited, explodes violently. The vapor is slightly irritating to the conjunctivæ, and at first to the bronchial mucous membrane.

Physiological Action.—When ether is poured over the skin it evaporates so quickly that a sensation of cold is experienced, and when its application is continued, as with the atomizer, the temperature of the part is lowered and it may be frozen, which is announced by sudden blanching of the skin. For this purpose and for local anæsthesia stronger ether is required. When the escape of the vapor is prevented ether acts as a counter-irritant, causing reddening; even vesication may be produced.

When taken internally, ether is a diffusible stimulant, like alcohol in its effects; although they are manifested earlier by ether, yet they are more transitory than when produced by spirits. When introduced into the circulation, by absorption from the stomach or the rectum, by inhalation, or hypodermatically, it is found to increase arterial tension and acts as a cardiac stimulant, the heart continuing to beat after failure of respiration. In these respects it is antagonistic to chloroform, which lowers arterial pressure and is a cardiac sedative. Ether-vapor is inhaled pure, while chloroform-vapor must be combined with 95 to 97 parts of atmospheric air. Upon the nerve-centres ether acts very much like alcohol, affecting (1) the cerebrum; (2) the sensory, and later the motor, functions of the spinal cord; (3) the sensory centres in the medulla oblongata; and (4) finally the motor centres in the medulla.

The State of Anæsthesia.—Anæsthesia produced by the inhalation of ether-vapor, when complete, nearly approximates the state of coma. It approaches by well-defined stages, the first being one of excitement or exhilaration; the second is narcosis; the third is abolition of sensibility and reflexes, and, carried further, it ends in paralysis and death from failure of respiration, owing to paralysis of the centres in the medulla oblongata. The nerve-centres are affected in the following order: The higher centres in the brain, the motor and sensory centres in the medulla spinalis, and, ultimately, the sensory and motor centres of the medulla oblongata. The vapor of ether is, at the beginning of the inhalation,

irritating to the air-passages, and may cause strangling sensations to the patient, but this soon passes away as anæsthesia becomes established; it may be necessary, at the outset, to allow some admixture of air, so as not to frighten the patient, but as soon as may be possible the pure ether-vapor is to be administered, so as to prevent efforts at vomiting. Owing to this irritation of the bronchial mucous membrane there may be produced congestion or œdema of the lungs, especially when the patient is not kept warm during the operation. During operations upon the mouth, and particularly in the extraction of teeth, the blood running down the throat, Dorr says, may cause spasm of the glottis, respiration becomes thus interfered with, and death may result. Blood passing from the mouth into the throat, he further adds, may bring on vomiting, which may speedily lead to asphyxia unless the operator stops for a few moments and cleanses out the parts. A few "don'ts" should be borne in mind when administering ether:—

1. Don't give it to a patient whose kidneys are diseased.

2. Don't give it when the stomach contains undigested food; the patient should be fasting.

3. Don't give it without removing artificial teeth from the mouth, as they may fall into the throat.

4. Don't give it unless the clothing is so loose as to allow freedom of respiration.

5. Don't give any anæsthetic to women, especially young women, except in the presence of witnesses, who can testify as to your actions during the period of unconsciousness of the patient, as under such circumstances women sometimes acquire fixed delusions which can only be met by testimony absolutely proving their falsity.

6. Don't forget that ether-vapor and air make an inflammable and explosive mixture, and that ether may take fire from the actual cautery as well as from a candle.

7. Don't forget that there are different qualities of ether, and that the proper kind for surgical purposes is washed ether or stronger ether (U. S. P.).

8. Don't forget that ether, like alcohol, lowers temperature, and that the patient should not be too much exposed to cold during operation.

9. Don't forget that ether causes death by respiratory failure, and that the color of the lips and ears is a better guide to the state of the blood than the radial pulse.

10. Don't forget that the anæsthetic state is a state of danger, and the patient is not safe until the effects of the ether have entirely passed off.

11. Don't forget that ether is eliminated rather slowly by the lungs

and the kidneys; so the patient should be watched for several hours after the administration.

The Choice of Anæsthetics.—The anæsthetic agent should be suited to the operation and to the circumstances of each case. For many trivial operations, or those which are rapidly performed, pure nitrous oxide gas is sufficient and much safer than the others. In young children, chloroform vapor is easier of administration than ether, and comparatively free from danger when properly administered; it also is preferred where the actual cautery is to be used, or where lights are required near the patient. In midwifery practice it also is the preferred anæsthetic. For all ordinary cases ether is safer than chloroform, and is by far the most frequently used. Bichloride of methylene has been tried in England to some extent, but as ordinarily sold it appears to be merely an impure chloroform. The bromide of ethyl is of more recent introduction, and when pure answers well for short operations, but does not have decided advantages over the best ether except in having a slightly more agreeable odor. For a lengthy operation it is well to supplement the action of the anæsthetic and stimulate the circulation by the preliminary administration of from 2 to 4 ounces of whisky. In a similar manner a hypodermatic injection of morphine (gr. $\frac{1}{4}$) and atropin ($\frac{1}{120}$) may be given before operating (Nussbaum's method). Various mixtures of anæsthetics have been proposed, the best known being the A. C. E. mixture of the London hospitals, containing alcohol 1, chloroform 2, and ether 3 parts; but owing to the different density of the vapors of the several substances, and the unequal boiling or vaporizing point and varying rates of diffusion, it is impossible to tell just how much of each is being given; and, therefore, these mixtures are not recommended. Where a patient dislikes ether, or takes it badly, the administration may commence with nitrous oxide and ether substituted later, or it may be preceded by a few whiffs of chloroform.

Treatment for Toxic Effects.—When a patient is too deeply narcotized or appears asphyxiated by the ether, artificial respiration, inhalation of ammonia, slapping the exposed surface of the chest with wet towels, and the faradic current will usually restore him. Rubbing the body so as to keep up the circulation, or the use of stimulating enemata, is also of service. Oxygen might be administered if at hand, or 2 atoms of oxygen with 1 of nitrogen monoxide,* or amyl nitrite inhaled so as to flush the brain and medullary centres with blood, or nitro-glycerin (gr. $\frac{1}{100}$) given hypodermatically.

What is called "primary anæsthesia" occurs early in the adminis-

*Walton's Oxygen Works, of New York, manufacture the combination of 2 atoms of oxygen with 1 atom of nitrogen monoxide, and furnish this gas in metal cylinders, which can be ordered of all pharmacists.

tration of the ether, at the time when narcosis begins. During this stage, which is very brief, small operations, incisions, punctures, etc., may be done without waiting for complete anæsthesia. In order to ascertain when it occurs, the patient is directed to extend one of his arms perpendicularly upward and to hold it up as long as he can. At the moment when narcosis occurs the arm falls, which is the signal for the operator to cut and for the administration of ether to cease. The patient regains consciousness at once, and generally there is no vomiting or other ill effects.

Ill Effects of Ether.—The unpleasant results which sometimes follow the administration of ether, such as nausea and vomiting, may be overcome by giving the patient a cup or two of either strong, hot coffee or tea. Dorr states* that often the bad effects of ether may be avoided by the patient keeping the eyelids closed for a time after regaining consciousness and interdicting the use of water either to wash out the mouth or to drink. In explanation he states that he has observed, in many cases after etherization for operations, especially in extracting teeth, nausea and vomiting follow from the employment of water. In the event of nausea, vomiting, or even wakefulness supervening, Dr. Dorr administers about 25 grains of bromide of potassium in strong coffee. At times the same authority gives from a few drops to a drachm of compound spirit of ether in water. Pancoast allays nausea and vomiting by the following pill:—

℞ Argenti nitratis,†	gr. ss.
Creasoti,	♏ij.
Pulv. aromatici,	gr. iv.

M. et ft. pil. no. ij.

Sig.: One pill at once, the second in the course of three or four hours.

The author can also commend bromide of sodium (15 to 20 grains, in soda-water, soda-mint-water, or cinnamon-water), camphor-water, the aromatic spirits of ammonia, citrate or hydrobromate of caffeine (1 to 4 grains at a dose), tincture of capsicum (10 to 20 drops at a dose), or the effervescent salts of bromide of sodium or caffeine, all of these being especially suitable for the treatment of the ill effects following the administration of ether.

Therapy.—Ether may be used locally for its refrigerating effects. In strangulated hernia the persistent dropping of ether upon the tumor sometimes causes spontaneous reduction. It dissolves fat from the skin, and is applied to wash the surface before a surgical operation, after using soap. The ether-spray may be used to benumb a part of the skin before

* Henry I. Dorr, M.D., D.D.S., Lectures on Anæsthetics, at the Philadelphia Dental College, December, 1890.

† Nitrate of silver and creasote, on being mixed, result in decomposition, and if the mixture is exposed to heat combustion may follow. Squire (see Squire's Companion to the British Pharmacopœia, fourteenth edition, 1886) recommends that the oxide of silver be first diffused through some inert powder, such as kaolin, to avoid an explosion.

making an incision; and, in chorea, ether-spray has been applied to the spine with good results. The ether-spray is also often very serviceable in allaying the pain of neuralgia, especially when seated in a superficial structure. The ether is directed immediately upon the course of the aching nerve. Ethereal preparations may be used internally for hysteria, colic, and the passage of biliary or renal calculi. Durand's remedy for gall-stones is equal parts of ether and turpentine-oil, given a teaspoonful at a dose. Internally, ether is a diffusible stimulant, and can be used hypodermatically in heart-failure (♏xx–xxx). Taken with water or syrup (ʒss–j), it affords relief in flatulence, spasmodic asthma, hysteria, or colic. It has similar effects to those of alcohol, and a habit of ether-drinking* has in like manner been established in some persons (although the odor of the breath plainly announces to others the fact that it has been taken), but its effects are more transitory than those of alcohol.

The internal administration of ether is capable of relieving mild attacks of angina pectoris. It is a good plan to combine 10 or 20 drops of ether with codliver-oil when the latter substance is not well borne. Ether facilitates the digestion and absorption of the oil, probably by increasing the secretion of pancreatic fluid. Hoffmann's anodyne in half-drachm doses is useful in sick-headache. The hypodermatic injection of from 15 minims to ½ drachm of ether in the neighborhood of the affected nerve has proved of value in sciatica. Barth obtained very excellent results in typhoid pneumonia from the subcutaneous injection of 15 to 20 minims of ether. The injections were given from two to four times daily, and were followed by notable increase in the strength and volume of the pulse. Castel reports favorably of the same method in small-pox. After puerperal, pulmonary, or other severe hæmorrhage, ether thrown under the skin stimulates the heart and may avert fatal syncope.

The following combinations of ether will be found serviceable:—

℞ Spts. ætheris comp., ... f℥ij.
Tinct. capsici, ... fʒj.
Spts. ammon. arom., ... ♏cc.
Aquæ sodæ menth., ... f℥ij.

M. Sig.: A teaspoonful in water every few minutes until relieved. This prescription is especially useful in the treatment of syncope, flatulence, and nervous or hysterical paroxysms.

℞ Spts. ætheris comp.,
Elix. lupulini,
Tinct. valerian. ammon., ... āā f℥j.

M. Sig.: Two teaspoonfuls in water every fifteen or twenty minutes. For hysteria and nervous sick-headache, neurasthenia, angina pectoris, and spasmodic asthma.

* See interesting address on "Ether-Drinking, its Prevalence and Results," by Ernest Hart, delivered before the Society for the Study and Cure of Inebriety, in the Provincial Medical Journal, November 1, 1890.

Spiritus Ætheris Compositus (U. S. P.), the compound spirit of ether, or Hoffmann's anodyne liquor, consists of 3 parts of ethereal oil, with 30 of stronger ether, in 67 parts of alcohol. In hysteria, flatulent colic, and nervousness, this solution is much in demand. Hoffmann's anodyne is likewise very serviceable in the treatment of hiccough, functional palpitation of the heart, or syncope. It will often afford relief in gastralgia. It is a diffusible stimulant and antispasmodic. The dose is from ♏xv to f℥j or ij, in sweetened water.

The following formulæ, containing compound spirit of ether, are useful:—

℞ Sodii bicarbonatis, ... ℨiss.
Spts. ammon. arom.,
Tinct. zingiberis, ... āā fℨj.
Spts. ætheris comp., ... f℥iv.

M. Sig.: Two teaspoonfuls in water for hysteria or flatulence. Repeat when necessary.

℞ Spts. ætheris nitrosi,
Vini erythroxyli cocæ, ... āā f℥ij.

M. Sig.: From one-half to a tablespoonful in water every hour or two as a stimulant.

Spiritus Ætheris Nitrosi (spirit of nitrous ether, sweet spirit of nitre) is an alcoholic solution of crude ethyl nitrite (5 per cent.), made by the action of sulphuric and nitric acids upon stronger alcohol, and consists chemically of alcohol, aldehyd, water, ethyl acetate, and pure ethyl nitrite (at least 4 per cent. of the last-named constituent). Upon the human system it acts as a diaphoretic and diuretic, and the ethyl nitrite acts as a sedative upon the circulation, especially when fever is present. The pharmacopœia directs that it should be kept in small, glass-stoppered bottles, in a dark place remote from lights or fire. Very much of the spirit of nitrous ether has not been properly kept, is deficient in strength, and has become acid from age. When this has occurred it should not be used. When good it renders excellent service as a diuretic, especially in scanty secretion of urine in elderly people.

Nitrous ether resembles the other nitrites in its sedative effects upon the system, but its action is overcome or modified in this form by the comparatively large quantity of alcohol accompanying it, which really makes the spirit of nitrous ether a diffusible stimulant. For this reason Whitla especially commends it in the dropsy of debilitated subjects. In fever it may be given (ℨss–j) in cold water or lemonade, or in combination with other remedies, as aconite or veratrum viride. It is widely used in fever, acts upon the skin as well as upon the circulation, and reduces the temperature. It is useful, above all, in the febrile affections of infancy and childhood. It enters into Brown Mixture (mist.

glycyrrhizæ co.), of which it constitutes 3 parts in 100, forming a popular remedy for acute bronchitis.

Spirit of nitrous ether can be employed in the following combinations with advantage:—

℞ Spts. ætheris nitrosi,
Aquæ camphoræ,
Liq. ammon. acetatis, ... āā f℥ij.
Antimonii et potassii tart., ... gr. j.
Morphinæ sulphatis, ... gr. ss.

M. Sig.: A tablespoonful in water every hour or two until relieved. For acute bronchitis, acute rheumatism, and in fevers.

℞ Spts. ætheris nitrosi,
Elix. humuli,
Syr. lactucarii, ... āā f℥ij.

M. Sig.: From a half to a tablespoonful every hour when unable to sleep. Serviceable in insomnia, general nervousness, and debility.

ÆTHER ACETICUS (U. S. P.).—**Acetic Ether.**

Dose, internally, ♏x–xxx.

The acetate of ethyl is soluble in 17 parts of water, and in all proportions of alcohol or chloroform. It enters into cologne and acetate-of-iron tincture. It has similar effects upon the system to ethyl oxide, and also can be used as an anæsthetic, but is slower in its action.

ÆTHER HYDRIODICUS.—Hydriodic Ether, Ethyl Iodide.

Dose, ♏v–xx, by inhalation.

This is very analogous to ethyl bromide, iodine merely replacing the bromine. It can be administered from a vial in drops on a handkerchief, or by gelatin capsules containing 5 minims each. It is not used for producing anæsthesia, but may be inhaled for syphilis, bronchitis, phthisis, catarrh, whooping-cough, asthma, or other spasmodic disorders.

ÆTHER HYDROBROMICUS.—Hydrobromic Ether, Ethyl Bromide. (*Not* Ethylene Bromide.)

Dose, fℨj, by inhalation.

Pharmacology.—This liquid has rather a pleasant odor and sweetish taste. When pure it is colorless, volatile, non-inflammable, and resembles ether or chloroform in its effects when taken internally or by inhalation. It is very slightly soluble in water, but freely soluble in alcohol and ether. Under the influence of light the bromine gradually separates, causing discoloration of the ethyl, when it becomes unfit for use, owing to the poisonous effects of bromine.

Therapy.—For anæsthesia, the pure ethyl bromide should only be used, as dangerous symptoms, even fatal results, have been ascribed to the use of impure preparations. In dosage it stands between ether and chloroform, and probably occupies the same relative position with regard

to safety. Its characteristic effects, when inhaled, are the rapid approach of anæsthesia, its brief duration, and the rapid return of consciousness. It is, consequently, ill adapted for use in prolonged operations. When sprayed upon a part it produces local anæsthesia. It may be inhaled in epilepsy, chorea, and other spasmodic diseases (about 1 drachm at a time). Being uninflammable and not unpleasant, it may be used instead of ether for surgical operations.

AGARICUS ALBUS.—Purging Agaric. (Polyporus officinalis, Boletus laricis; order, Basidiomycetes, Hymenomycetes.)

Dose, gr. x–xxx.

Preparations.

Agaricin.—Dose, gr. $\frac{1}{12}$–j.
Extractum Agarici.—Dose, gr. iii–vj.
Tinctura Agarici.—Dose, ♏xx–lx.

Pharmacology.—The European larch has a fungus which grows in large, hoof-shaped masses horizontally from the trunk, and penetrates, with its mycelium, deeply into the wood. The masses are collected in Europe and Asia Minor, and, after peeling and drying, they form yellowish-white, friable, spongy, irregular balls, from the size of an orange up to that of a cocoa-nut. It has a heavy, fungus-like odor, a sweetish, followed by a bitter, nauseous taste, and its powder is irritating to eyes and nose. It largely consists of resinous matter, **Agaricin.** In doses of gr. x or more it acts as a purgative, in small doses is tonic and anhydrotic.

Physiological Action.—In small doses (gr. i–v) agaricin acts like atropine, but does not dilate the pupil. It is a compound body, the active principle of which is termed agaric acid. But Hoffmeister has shown that the substance employed under the name of agaricin or agaric acid is an impure product. Pure agaric acid is a white, light, crystalline powder, of a silky lustre. It crystallizes out of absolute alcohol in groups of tuft-like needles or as distinct rosettes. Its melting-point is 138° C. (280.4° F.). The free acid is but slightly soluble in cold water, but is moderately soluble in boiling water. Its alkaline combinations are freely soluble, but its heavy metallic salts are insoluble. It is a strong local irritant, and its subcutaneous injection results in active inflammation with the production of pus. On account of its slow absorption, it produces no grave symptoms in warm-blooded animals. The subcutaneous or intra-venous injection of a soluble salt first excites, and then paralyzes, the vagus and vasomotor centres. Death is preceded by convulsions, and results from cessation of respiration or, in animals when artificial respiration is kept up, from the extreme fall of blood-pressure. The influence upon the secretion of sweat is not central, but is exerted upon the secretory glands.

It, therefore, becomes a matter of prime importance that pure agaric acid should be employed. The pure acid is little liable to excite vomiting and purging, and it is well borne in doses of from $\frac{1}{3}$ to $\frac{1}{2}$ grain. Since its anhydrotic activity appears gradually, small doses, given repeatedly, will be free from the unpleasant consequences which might follow a single large dose.*

Therapy.—Agaricin, in doses of gr. $\frac{1}{12}$–j, is used to check night-sweating, and sometimes to suppress lactation.

℞ Agaricin., ... gr. j.
Acid. sulph. aromat., ... f℥iv.
Elixir, ... f℥iss.

M. Sig.: Take one drachm every four hours in water.

It has been also recommended to combine a small quantity of Dover's powder with each dose of agaricin, when there is a tendency to looseness of the bowels following its use.

AGARICUS CHIRURGORUM.—Polyporus Igniarius.

This is an allied fungus to the preceding, but is used solely on account of its porous texture. It has been employed as a mechanical hæmostatic and for its slow burning as a moxa. It may be soaked in potassium nitrate or chlorate solution, which makes it more inflammable.

AGARICUS MUSCARIUS.—Amanita Muscaria, or **Fly-Fungus** (Basidiomycetes, Hymenomycetes).

Preparations.

Muscarina.—Muscarine. *Dose*, gr. $\frac{1}{4}$–ij.
Muscarinæ Nitras.—Muscarine Nitrate. *Dose*, gr. $\frac{1}{12}$–j.

Pharmacology.—A poisonous mushroom, consisting largely of fungus-cellulose. Its active principle is a syrupy alkaloid, **Muscarine.** It is without taste or odor, but produces powerfully intoxicating effects somewhat analogous to pilocarpine in its action, and antagonized by atropine. The alkaloid is soluble in water, and mushroom poisoning may be prevented by soaking the mushrooms in water slightly acidulated with vinegar. In cases of poisoning, Whitla has successfully used atropine and diffusible stimulants. Digitalis may also be given hypodermatically, and stimulating enemata administered.

Physiological Action.—The action of the heart and the respiratory movements are diminished by large doses, the heart being finally arrested in diastole. Smaller doses diminish blood-pressure and reduce temperature, although the bodily heat may be secondarily increased. The secretions of the skin, the liver, and intestinal tract are increased, while that of the kidneys is sometimes reduced or suppressed. The muscular system

* Deutsch. Med. Wochenschr., September 10, 1889; Medical Bulletin, January, 1890.

is relaxed, but convulsions may occur from accumulation of carbonic acid in the blood. Upon the brain a marked narcotic or stupefying effect is observed, so that it has been used in Asia as an intoxicant. The pupil contracts from the effects of the internal administration, while the local application of muscarine may cause dilatation.

Therapy.—Administered medicinally, muscarine has some reputation in checking the fever and sweating of phthisis. It may be used in affections of the respiratory tract where there is deficiency of secretion, or in disorders of the alimentary canal where the same indication is to be met, and to overcome a tendency to constipation. Muscarine can therefore be combined with such drugs as belladonna, hyoscyamus, strychnine, aloin, cascara sagrada, or sulphur with advantage, as in the following formulæ:—

℞ Muscarinæ,	gr. iij.
Ext. ignatiæ,	gr. j.
Aloini,	
Ext. belladonnæ alc.,	āā gr. iss.
Ext. gentianæ,	gr. xvj.

M. et ft. pil. no. xvj.

Sig.: One pill two or three times a day. Beneficial in constipation and in catarrhal jaundice.

℞ Muscarinæ,	gr. iiss.
Ext. hyoscyami alc.,	gr. iss.
Ext. cascaræ sagradæ,	gr. iv.
Sulphuris subl.,	ʒiss.

M. et ft. capsulæ no. xvj.

Sig.: A capsule three times a day. Serviceable in constipation and in hæmorrhoids.

In diabetes mellitus and polyuria, muscarine has been tried in common with many other agents, but without constant good results.

The dose of muscarine is usually gr. $\frac{1}{8}$–ij, in solution, or the nitrate of muscarine may be given in somewhat smaller doses. For the sweating of phthisis, Murrell uses a 1-per-cent. solution, of which the dose is 5 minims.

AILANTHUS GLANDULOSA.—Ailanthus-Tree, Chinese Sumach.

Pharmacology.—The Ailanthus, or Tree of Heaven (belonging to the natural order Simarubaceæ), has been brought from China, and is now naturalized in this country as a shade-tree. The inner bark, which is the part used, contains an oleoresin and a volatile oil.

The fluid extract (dose, ♏x–ʒj) and the tincture (in doses of ʒss–ij) are not officinal, but have been used. The bark may be given in doses of from 5 to 10 grains.

Physiological Action.—When taken in full doses, ailanthus nauseates and purges; it also gives rise to vertigo, headache, pains in the back and

limbs, and prostration, with numbness or tingling. Both respiration and pulse-rate are reduced; death results from arrest of respiration.

Therapy.—The fresh bark is used in the treatment of tape-worm, in decoction (℥iv–Oj) or the oleoresin (in ℥j doses). It has also been used in malignant scarlatina and in spasmodic disorders.

ALCOHOL (U. S. P.).—Alcohol, Spirit of Wine.

Preparations.

Alcohol Dilutum (U. S. P.).—Dilute Alcohol (50 per cent. distilled water).
Spiritus Frumenti (U. S. P.).—Whisky (contains about 50 per cent. of alcohol).
Spiritus Vini Gallici (U. S. P.).—Brandy (contains about 50 per cent. of alcohol).
Spiritus Odoratus (U. S. P.).—Cologne-Water. For external use.
Spiritus Myrciæ (U. S. P.).—Bay Rum.
Vinum Album (U. S. P.).—White Wine (10 to 12 per cent. alcohol).
Vinum Album Fortius (U. S. P.).—Stronger White Wine (20 to 25 per cent. alcohol).
Vinum Rubrum (U. S. P.).—Red Wine (10 to 12 per cent. alcohol).
Vinum Aromaticum (U. S. P.).—Aromatic Wine (lavender, origanum, peppermint, rosemary, sage, wormwood, of each 1 part; stronger white wine, enough to make 100 parts). For external use.

Alcohol is a liquid composed of 91 per cent. by weight (94 by volume) of ethylic alcohol, and of 9 per cent. by weight (6 by volume) of water. Specific gravity 0.820 at 60° F. It is a transparent, colorless, volatile, and inflammable substance, with a characteristic, rather pungent taste and odor.

Pharmacology.—The hydrate of the hydrocarbon radical (C_2H_5) is ordinarily understood to be meant by the term alcohol, although many other substances are known to the chemist under this name, none of which, however, are used in medicine,* although the physiological effects have been investigated. Ethylic alcohol also is the alcohol of brandy, whisky, wine, and various spirits and cordials. Its effects upon the organism are transitory and less dangerous than those of other alcohols, such as amylic, methylic, or butylic. During distillation of grain, unless carefully managed, considerable amylic alcohol will pass over with the ethylic, especially if the process be continued too long. By keeping whisky stored for several years, the amylic alcohol becomes changed into various ethers, which impart a flavor to the spirit. The United States Pharmacopœia directs that grain-spirit (whisky) should be at least two years old; and the spirit from fermented grapes (brandy) at least four years old. Wine is made by fermentation without distillation. Red wine is a deep-red alcoholic liquid made by fermenting the juice of colored grapes in the presence of their skins; white wine is of a pale-

* If phenol and glycerin are to be considered as alcohols, they are exceptions to this statement.

amber or straw color, and is obtained by fermenting the unmodified juice of the grape, free from seeds, stems, and skins. Gin (spiritus Genevæ) is not officinal; it is obtained by adding juniper-berries to dilute alcohol. Rum, or molasses spirit (spiritus fuscus or Jamaicencis), is made by distillation from sugar or molasses which has undergone alcoholic fermentation; it is about the same alcoholic strength as whisky.

Alcohol dissolves alkaloids, fatty and resinous substances, and is largely used as a menstruum in obtaining the active principles of drugs in an available form for administration. It is the basis of the (U. S. P.) spirits, tinctures, and elixirs; spirits being solutions of volatile substances in alcohol; tinctures, solutions of active principles of plants, generally obtained by maceration and percolation. An elixir is a cordial flavored with orange and syrup, used as a vehicle for other remedies, and as a stomachic. Malt liquors—ale, beer, porter, etc.—are produced by fermentation of malt and hops, and contain nutritive material, together with a small proportion of diastase, which makes them useful in certain cases of weak digestion. They contain only from 6 to 10 per cent. of alcohol. Malt liquors can be taken by those who suffer from the cerebral effects of wine, but to some they are unpleasant in their effects upon the brain, owing to the oil of hops which they contain (Rossbach).

Absolutely pure alcohol is rarely found, even in the laboratory of the chemist. Owing to its great affinity for water, it will even abstract it from the air. What is known as absolute alcohol of the shops usually contains about 2 per cent. of water. It is a colorless, pleasant-smelling liquid, with a sharp, warm taste. When added to water, heat is developed, and the mixture does not measure as much as the sum of its constituents owing to combination. Besides its affinity for water and its power as a solvent, it has a coagulating action upon albumin, and is an antiferment when in solution, containing at least 18 per cent. of alcohol.

Physiological Action.—Owing to volatility, it gives a cool sensation to the skin at first, but afterward, if its evaporation be interfered with, it causes irritation and heat, and, if continued, produces inflammation. It also hardens the integument by abstracting water from it, coagulating some of its albuminoid constituents, and dissolving its fat. It has the same effect upon mucous membranes, thus enabling it to act as an astringent. It has some anæsthetic action, possibly by reducing the congestion by its constringent effects upon the smaller blood-vessels. Flannel wet with hot whisky relieves pain in neuralgia of the face. After alcohol in the strength of ordinary spirits is swallowed, in small quantity (f℥ss–ij), there is a sensation of heat in the epigastrium, which soon diffuses itself over the body. It increases the appetite and the digestive power, causing

an increased flow of gastric juice. If taken in larger quantities, appetite is lost and nausea appears, and the digestive power is suspended. As a result of long-continued indulgence in alcohol, the stomach undergoes changes in its coats, new areolar tissue being formed, which, by its subsequent contraction, strangulates the gastric glands; hence, dyspepsia and gastric catarrh, with morning vomiting are very common among drunkards. In addition to structural change, alcohol in excess precipitates pepsin from the gastric juice and thus increases digestive difficulties. The experiments of Dr. Beaumont showed that small amounts increased the vascularity of the stomach and stimulated the flow of gastric secretions. Its antiseptic powers are useful in infectious dyspepsia, where digestion is stopped by the growth of micro-organisms, which set up abnormal fermentation in the stomach and intestinal canal. Its acknowledged value in the zymotic diseases, and pre-eminently in diphtheria, is partly due to its antiseptic action in the alimentary tract. In cholera epidemics, alcohol has decided prophylactic effects, and this is not controverted by the fact that persons weakened by debauches and alcoholism are most liable to perish from the disease. In cholera infantum, brandy exerts an excellent influence; and, indeed, in many bowel disorders among adults (which are often connected with the growth of micro-organisms) alcohol in the form of brandy or red wine (Port or Burgundy) is of great assistance in the treatment. When flatulent colic or neuralgic pains occur in the abdomen, cloths wet with hot whisky externally and some hot toddy internally give prompt relief; in infants, gin and hot water is the remedy most often used for colic.

Upon the nervous system, alcohol first has an exciting effect, followed by narcotism or coma. The arterioles are dilated, thus admitting more blood to the brain, and this is succeeded by diminution of mental activity, owing to the effects of the alcohol upon the ganglion-cells, weakening their action. A similar effect is seen on the spinal cord, usually occurring later than, but sometimes preceding, the brain symptoms. The reflex action of the cord is reduced and the power of co-ordination impaired, so that walking is by a staggering gait, and finally the knees will no longer support the body. This paralyzing effect is also seen in the sympathetic system, since the dilatation of certain vascular areas must be due to the loss of function of the vasomotor nerves. The action upon the centres in the medulla is seen in the lowered temperature, the slowing of the pulse after a preliminary acceleration, and the sighing respiration or stertor. Death is produced by respiratory paralysis and lowering of the bodily heat. From this it is seen that alcohol will not keep out cold, but will actually hasten the occurrence of death from cold. The experience of Arctic voyagers is to the effect that those persons endure the

rigors of the winter best who abstain from alcohol. Dr. Parkes, in the Ashantee campaign, also found that the fatigue of marching in the tropics is borne better without the aid of a spirit ration, owing to the diminution of muscular and nervous energy and capacity for work, due to the physiological action of this agent. The only advantage derived from its use was to take away the feelings of fatigue after the men had come into camp, and thus enable them to eat. It is also useful, in the form of hot drink, to revive a person who has been exposed to cold after the exposure has ceased.

As to the changes that alcohol undergoes in the body, Anstie states that a variable amount (℥i–iv) disappears, or is burnt up in the blood or the tissues; this quantity may be increased by habit. The excess is thrown off by the lungs, kidneys, bowels, and possibly by the skin.

Toxicology.—The symptoms of acute poisoning by alcohol differ so much from those of the chronic form of alcoholism that each state must be separately considered :—

1. Acute poisoning by alcohol manifests itself by an exaggeration of the physiological action. The rapidity with which grave symptoms appear is in proportion to the quantity of alcohol taken, its form, and, to some extent, its temperature, as hot drinks more rapidly intoxicate than cold. Where a large quantity is taken at once, as when a whole bottle of whisky is drunk on a wager, or a comparatively large quantity administered to a child, the stage of excitement is too brief to be noticed, and the patient falls at once into a stupor, which may be followed by coma or fatal convulsions. Where the administration is spread out over a longer period, drunkenness comes on progressively, but ends in unconsciousness and insensibility, and the patient is said to be dead-drunk, because of his complete helplessness. Since alcohol increases the blood-supply of the brain (and especially since drunken men are apt to fall heavily and strike their heads, or to quarrel and have others do it for them), the state of alcoholic coma may often be accompanied by meningeal hæmorrhage or apoplexy. Intoxicated persons should never be allowed to sleep off their drunkenness, but should be treated as if they were poisoned, as in fact they are. The treatment consists simply in evacuating the stomach with emetics (mustard, etc.), or the pump, and administering ammonia, either the aromatic spirit or the carbonate, both by the mouth and by inhalation. The spirit of Mindererus likewise fulfills the same purpose. Digitalis may be given hypodermatically ; or, if the patient is noisy, morphine and atropine in moderate doses. It is said that an ounce or two of cider-vinegar has a sobering effect; and after emptying the stomach with the stomach-pump it is well to introduce a pint of warm coffee,—it should not be *hot* coffee, for fear of

injuring the stomach during unconsciousness. Artificial respiration and electricity may be required to keep up the breathing and prevent the undue accumulation of carbonic acid in the blood. Cold affusions should be used with care, on account of the lowering of temperature by the alcohol; but heat and sinapisms are of great utility. Apoplexy, or cerebral hæmorrhage, may be suspected when there is marked deviation of the eyes or unequal dilatation of the pupils, especially if there is co-existing paralysis of one side of the face, or of the arm or leg. In such a case the question of surgical interference would come up, to decide upon the presence of fracture of the skull, or meningeal hæmorrhage.

2. Chronic poisoning by alcohol may be shown by the changes taking place in the stomach, liver, and kidneys, increase of fibrous or areolar tissue, followed by contraction and destruction of the characteristic secreting cells, and fatty infiltration, or, in other words, the type of cirrhosis due to the long-continued action of alcohol upon the tissues. Gastric catarrh, indigestion due to deficient action of the liver, and albuminuria from contracted and crippled kidneys are commonly met with in old alcoholic subjects. Chronic catarrhal pneumonia and fibroid phthisis are also attributable to alcohol. The effects, however, are most marked upon the nervous system. Dr. Wilks has reported cases of paraplegia and numbness. Anæsthesia and violent shooting pains have followed the long-continued and excessive use of alcohol. One form of insanity is accompanied by pachymeningitis, which may be caused by alcohol. But when alcoholic poisoning is mentioned we generally understand it to mean delirium tremens or mania a potu. These are not identical; the latter is, to all intents and purposes, an attack of acute mania caused or incited by alcoholic excess. Delirium tremens, on the contrary, is a milder form of delirium, due partly to the action of the alcohol upon the brain, but also very largely to anæmia of the great centres. In the former the patient is violent, and requires several men to control him; but once controlled, and the proper medicines given (potassium bromide, hyoscyamine [gr. $\frac{1}{8}$–$\frac{1}{2}$], or chloroform inhalations), the patient, after a period of sleep, rapidly recovers. In delirium tremens the symptoms are mainly those of anæmia of the brain; it is apt to occur after a bout of drinking lasting several days, during which very little food is eaten, or is rejected by vomiting from the excess of alcohol. Here the patient has a quiet delirium, and has hallucinations of sight and hearing, which in many cases interest him, but his visions may be horrifying and distressing. These patients are best treated with digitalis, and nitrite of amyl may be cautiously given by inhalation, or nitro-glycerin by the mouth. Nourishment must be given in a form readily assimi-

lated and at short intervals, hot broths well seasoned being the most acceptable to the stomach. If, as is usually the case, the patient has been a steady drinker for a long time, alcohol must not be entirely withheld from him, but given in combination with food. In such subjects the blood-vessels are generally the subject of atheromatous changes, and the heart requires some stimulation in order to carry on the circulation. If the patient cannot sleep, he may be helped by bromide of sodium and chloral (āā gr. x), by somnal (ʒss–j), by hop-tea, or the ammoniated tincture of valerian. For the debility and tremor, nux vomica has proved very useful in comparatively large doses of the tincture (fʒss or more). After death from chronic alcoholism the organism shows changes in every part, which Bartholow sums up in two words,—"fibrosis and steatosis."

By inhaling the vapor of alcohol complete anæsthesia may be produced, and the different degrees of intoxication up to insensibility. In such cases the stomach need not be emptied, but artificial respiration in the open air, or the inhalation of oxygen will soon restore the patient to consciousness. This may be hastened by a stimulating enema.

Absinthism, a form of alcoholic poisoning attended by epilepsy, following indulgence in absinthe, has been already discussed (see page 356).

Therapy.—Alcohol may be used as an evaporating lotion in cases of local inflammation, or of bruise or sprain. Dilute alcohol (f℥iij) with lead-water (f℥j) and acetate of morphine (gr. x), applied upon a single layer of cloth or absorbent cotton and allowed to evaporate, forms an excellent lotion to keep down inflammation, and in point of cleanliness is much better than the old lead-water and laudanum. Absolute alcohol is used as an astringent application to exuberant granulations (polypi) in the ear, and also applied as just directed to control acute inflammation of cellular tissue. Alcohol is a good application to prevent bed-sores, and for this purpose it is customary to add a little alum (ʒj to Oj). Hot applications of alcohol relieve pain, and in facial neuralgia, cold in the face, or toothache, the employment of a small flannel bag containing hops and dipped in hot whisky will generally afford marked relief. In some skin diseases, as ulcers, loss of hair, frost-bite, excessive secretion of sweat or oil, fetid sweating, freckles, and vegetable parasitic affections, concentrated alcoholic preparations may be used. Some useful formulæ are here added:—

℞ Spt. vini rectificat.,
Sol. boro-glyceridi (50 per cent.), ... āā f℥ij.

M. Sig.: Apply freely in excessive or fetid sweating, and in vegetable parasitic diseases of the skin.

When glycerin does not agree, we may prescribe :—

℞ Spt. vini rectificat., ... f℥ij.
Cocainæ hydrochloratis, ... gr. v.
Acidi borici, ... ʒj.

M. Sig.: Use with old muslin or cotton in frost-bite, oily secretion, freckles, and other pigmentary deposits.

℞ Spt. vini gallici, ... f℥iv.
Tinct. nucis vomicæ,
Tinct. capsici, ... āā f℥ss.

M. Sig.: Employ it on the scalp for loss of hair.

Its antiseptic virtues and the astringency which it possesses in consequence of its power of coagulating albumin renders alcohol an excellent gargle in pharyngitis, stomatitis, scurvy, and salivation. It is also useful to apply an alcoholic lotion to the nipples of nursing women, in order to prevent the formation of fissures. Alcohol possesses considerable value as a hæmostatic, and may be utilized in cases where capillary oozing occurs, the following prescription being very valuable :—

℞ Spt. vini rectificat.,
Lin. saponis,
Ext. hamamelidis, fl., ... āā f℥j.

M. Sig.: Employ as a styptic in local hæmorrhage.

To the action upon the digestive organs, and the stimulating effect upon the nervous system and the circulation of alcohol judiciously given, are to be ascribed its usefulness in the treatment of disease. It is not used in the sick to reduce temperature, although it accomplishes this in health; nor is it given as a narcotic, although its sedative action may not be undesired. In almost all cases it is intended to act as a restorative, and, therefore, its administration must be kept well within physiological limits. In some cases, especially in typhoid fever, unfortunate results have followed its use with too free a hand. In most cases of fever, from f℥ii–iv of whisky daily is amply sufficient, and more than this does harm. It is judicious, however, to make allowance for the patient's habits. One accustomed to the daily use of alcoholic beverages will require proportionally larger doses than an abstainer when attacked by any severe disease.

In phthisis, a tolerance seems to exist and patients can take relatively large quantities without showing any symptoms of intoxication. The late Professor Flint reported the case of a young lady who took a pint of whisky daily for nearly two years for pulmonary phthisis, and was finally cured. In the course of a disease, when the powers of life are succumbing, the first sound of the heart is weak, the pulse feeble, soft, and irregular, but generally rapid; when syncope or delirium threatens, alcohol should be given, endeavoring to combine it with food,

such as broth, milk, gruel, etc. The period at which these symptoms generally appear is, in typhus fever, about the end of the first week; in typhoid, at the end of the second week; in small-pox, when the secondary fever commences. The excellent practical rules formulated by Dr. Armstrong for the use of alcohol in fever may be confidently followed. Alcohol is beneficial when the dry tongue moistens under its use, the rapid pulse becomes more slow, the skin less parched, and the respiration more tranquil. If opposite results follow, the remedy should be suspended. To the above rules, Ringer adds that alcohol does good when it produces sleep and quells delirium. In measles, when the eruption turns dark or hæmorrhagic, alcohol is best given in as large doses as will be borne, and at short intervals, as pointed out by Dr. Keating. In acute inflammations, as in pneumonia, when the heart begins to fail and symptoms of debility appear, alcohol can usually be given with marked benefit. In hypostatic congestion of the lungs, typhoid pneumonia, or the pneumonia of the aged, alcoholic stimulation is particularly indicated. Diphtheria, phlegmonous erysipelas, tuberculosis of bones, joints, or glands are affections in which stimulation is demanded. The stronger alcoholic beverages, such as wine, whisky, or brandy, are valuable in old age, when digestion is weak and insomnia marked. Hot spirits and water, cautiously administered, is useful as a restorative in the condition of shock the result of injury. During convalescence from fevers, when the structures of the heart and stomach have been altered by the fever process and digestion is weak, it is often found that malt liquor in some form increases appetite and digestion, improves nutrition, and enables the patient to sleep better at night. In the same way, persons who follow sedentary occupations, and whose bodies are insufficiently nourished, often find much benefit from the use of alcohol in moderate quantities, given just before or taken with their meals.

Forms of Alcohol.—In order to estimate the effects of different forms of alcoholic liquors, the following comparative strength should be remembered:—

Brandy, whisky, rum, gin, cordials, .	30 to 50	per	cent.	of absolute	alcohol.
Spanish and Italian sweet wines, .	13 to 17	"	"	"	"
Hock and claret, ...	8 to 11	"	"	"	"
Ale or porter, ...	4 to 6	"	"	"	"
Stout or beer, ...	4 to 5	"	"	"	"
Koumyss, ...	1 to 3	"	"	"	"

Champagne contains from 8 to 10 per cent., but the presence of the carbonic-acid gas makes it more "heady;" that is to say, the cerebral stimulation is produced more quickly, and with a smaller quantity of alcohol than by the still wines, and the after-effects in the way of headache,

or cerebral congestion, are less apt to occur. Moreover, the carbonic acid acts as a sedative to the stomach, thus making champagne especially serviceable where the stomach is irritable, and where prompt stimulation is required, as in sea-sickness, or in yellow fever. Where the expense is an insuperable objection, a good substitute may be made extemporaneously by the addition of carbonic-acid water to wine or brandy. Owing to the unreliability of French wines and the practical impossibility of obtaining pure imported brandy, it is our duty to use domestic wines when they have been demonstrated to be sound and pure. The wines of the California Vintage Company fulfill these indications perfectly, and their brandy has received the indorsement of Dr. Foster, the editor of the *New York Medical Journal*, and many other prominent physicians. When we cannot use these wines or brandy, it is safer to prescribe whisky of some standard make.

Special Applications.—As an antidote in snake-bite, alcohol enjoys an extensive reputation, which is not without good foundation. The liquor should be given according to effect, a wineglassful or so at a time, repeated at intervals. A ligature should be thrown around the limb or member bitten, if possible, and the part cut out or cauterized; if a finger, it might be safer to amputate it. The ligature should be loosened gradually, and immediately tightened upon the re-appearance of the symptoms. In this way the system will be able to throw off the poison; whereas, if the whole quantity were to be introduced at once, it would be overwhelmed. The alcohol here acts as a stimulant to keep up the circulation until the poison is eliminated.

In septic poisoning, septicæmia, sapræmia, dissecting wounds, etc., alcohol is considered to have an antidotal effect, and, with quinine, constitutes the great reliance for overcoming the tendency to a fatal result, and keeping up the strength. Alcohol is in some measure antidotal to the poison of the bacillus tuberculosis, and it is to this action that its unquestionable value in prolonging life in phthisis is due.

Alcohol should not be given in cases of liver disease, nor in nephritis. In gout, the sweet wines and malt liquors are inadmissible, but, if a stimulant is required, whisky may be used cautiously, on account of the tendency to kidney disease. During the course of a gonorrhœa or urethritis, it is customary to forbid the use of alcohol in any form. It should not be used in hypertrophy, with overaction of the heart.

ALLIUM (U. S. P.).—Garlic.

Preparation.

Syrupus Allii (U. S. P.).—The Syrup of Garlic contains garlic 15, acetic acid 40, and sugar 65 parts. *Dose*, ♏x–ʒj.

Pharmacology.—Garlic is the dried bulb of the Allium sativum (Liliaceæ), a native of Asia and Egypt, but now naturalized in Europe and America, and resembles the onion and leek in its chemical characters, as its active principle is a volatile, oily substance,—allyl sulphide. Garlic is more active than the others owing to possessing a larger proportion of the active principle. Only sound, fresh, pungent bulbs should be used.

Physiological Action and Therapy.—Garlic is antiseptic, but its effects are chiefly those of a stimulating expectorant. While its antiseptic properties have been tried in phthisis without successful results, it is useful as an expectorant in chronic bronchitis, or in suffocative catarrh (capillary bronchitis of infants). Here it may also be made one of the ingredients of poultices to be applied to the chest, or the oil may be used externally, but the offensive odor of garlic will in most families be a bar to its use. A garlic poultice may also be successfully employed in infantile convulsions, and relieves the pain of gastro-enteritis. The syrup is a good addition to cough mixtures, but cannot be used in conjunction with alkalies, such as carbonate of ammonium or the bromides, on account of containing free acetic acid. The syrup of garlic can be administered thus with service in the treatment of bronchitis, especially of children:—

℞ Syrup. allii, ... f℥ij.
Spts. æther. nitrosi, ... f℥j.
Glycerini, ... f℥j.

M. Sig.: From one to two teaspoonfuls in water every hour or two.

℞ Syrup. allii, ... f℥iij.
Syrup. picis liquidæ, ... f℥ij.

M. Sig.: A teaspoonful or two in water every two or three hours.

Garlic, like the onion, has antiscorbutic effects, and is a stimulant carminative. Dose, gr. xxx; best given as a syrup. It is destructive to lumbricoid or round worms.

ALLIUM CEPA.—Onion.

Preparation.

Syrupus Allii Cepæ.—The Syrup of Onion. *Dose*, f℥i–iv.

Pharmacology and Therapy.—The onion (Liliaceæ) is cultivated everywhere, and the bulb is commonly used as a food. Although not officinal, onions are largely used in domestic practice, as a cataplasm for "earache," or for acute bronchitis; also added to sugar and water and given as a cough-syrup. Parkes ("Practical Hygiene") states that "on account of its volatile oils the onion tribe is largely used, and is a capital condiment, and has an effect as an antiscorbutic." It contains

some citrate of lime in addition to the allyl sulphide. Dr. Whitla points out that, owing to the large proportion of sulphur which it contains, the Spanish onion may be satisfactorily employed in those cases in which it is desirable to administer sulphur. The action of the volatile constituents enhances that of the sulphur. Boiled Spanish onion, eaten freely at bed-time, is an excellent laxative. The author mentioned values the onion particularly in chronic catarrh of the larger respiratory tubes. According to George Covert, sweet milk removes the odor of onion from the breath.* The author can commend the appended prescription for chronic bronchitis in children. The same is also of benefit sometimes in chronic eczema:—

℞ Syrup. allii cepæ (from Spanish onion), ... f℥iv.
Syrup. phosphat. co., ... ℥j.
M. Sig.: One or two teaspoonfuls in water or milk three or four times a day.

The raw, sliced onion can be used as a counter-irritant; its volatile constituents are especially irritating to the conjunctiva.

ALNUS.—Alder-Bark.

Dose, gr. x–xl, in decoction, infusion, or fluid extract.

Pharmacology and Therapy.—The bark of the American alder or tag alder, Alnus serrulata (Betulaceæ), contains tannic acid, a resin, and an oil. It is used for its astringent effects chiefly in the form of fluid extract or infusion (℥j to Oj), as a mouth-wash for spongy gums, a gargle for sore throat, an injection in leucorrhœa, and for applications to ulcers. Internally, it has been given in diarrhœa and hæmaturia. It is reported to have alterative effects, and has been used successfully in scrofula, syphilis, and some cutaneous diseases.

Alnuin, an alcoholic extract, composed principally of the resin, has been used internally in doses of gr. i–iij.

ALOE (U. S. P.).—Aloes.

Preparations.

Aloe Purificata (U. S. P.).—A strained alcoholic extract. *Dose*, gr. i–xx.

Extractum Aloës Aquosum (U. S. P.).—Watery extract. *Dose*, gr. ss–v.

Pilulæ Aloës (U. S. P.).—Purified Aloes and Soap, each gr. ij.

Pilulæ Aloës et Asafœtidæ (U. S. P.).—Purified Aloes, Asafetida, and Soap, each gr. 1⅓.

Pilulæ Aloës et Ferri (U. S. P.).—Purified Aloes, Sulphate Iron, and Pulv. Aromat., each gr. j.

Pilulæ Aloës et Mastiches (U. S. P.).—Purified Aloes, 4 parts; Mastic and Rose-Leaves, each 1 part. Two grains of aloes in each pill.

Pilulæ Aloës et Myrrhæ (U. S. P.).—Purified Aloes, 2 parts; Myrrh, 1 part; Pulv Aromat., gr. ½, in each pill.

* Chicago Medical Times, January, 1890.

Pilulæ Rhei Compositæ (U. S. P.).—Purified Aloes, gr. iss; Rhubarb, gr. ij; Myrrh, gr. j.

Tincturæ Aloës (U. S. P.).*—10 per cent. *Dose*, f℥ss–ij.

Tinctura Aloës et Myrrhæ (U. S. P.).—Of each, 10 per cent. *Dose*, ℥ss–ij.

Vinum Aloës (U. S. P.).—Purified Aloes, 6 parts; Cardamom., 1 part; Ginger, 1 part; in Stronger White Wine, 100 parts. *Dose*, ℥i–iv.

Aloïn.—Dose, gr. $\frac{1}{10}$–ij.

Pulvis Aloës et Canellæ.†—Aloes, 80 parts; Canella Alba, 20 parts. *Dose*, gr. xx.

Extractum Aloës Liquidum (50 per cent.).—*Dose*, ♏v–xl.

Decoctum Aloës Compositum (*Baume de vie*) contains about 4 grains aloes to the ounce, with cardamom and liquorice-extract and myrrh. *Dose*, f℥ss–ij.

Aloes also enters into compound extract of colocynth (50 per cent.) and compound tincture of benzoin (2 per cent.).

Pharmacology.—Aloes is the inspissated juice of the leaves of Aloe socotrina (Liliaceæ). Owing to the fact that aloes frequently contains foreign matters, the pharmacopœia directs that for making preparations only purified aloes should be used, obtained by dissolving aloes in alcohol, passing the solution through a strainer, and allowing the alcohol to evaporate. This occurs in dark masses of a yellowish-brown color, the fracture presenting a liver-like appearance (hepatic aloes). It has a very bitter taste, is soluble in alcohol, less soluble in water, unless boiling, and contains **Aloin**, or socaloin, a volatile oil and a resin. Barbadoes aloes (Aloe vulgaris) and Cape aloes (Aloe Capensis), each of which contains a variety of aloin, are not officinal in the last revision of the United States Pharmacopœia.

Physiological Action.—The principal effect of aloes is that of a slowly-acting purgative, principally affecting the large intestine. It increases the peristaltic movements without producing excess of secretion; so that the fæces are formed and only slightly softened. It is a true cholagogue, increasing the secretion of biliary salts, and renders the bile more watery when given in large doses. As it sometimes gripes, it is best to combine some carminative with it. It may cause irritation of the bladder, diminution of urine, and albuminuria from renal congestion. It also has emmenagogue properties. Following large doses, the uterus and appendages are more or less in a state of congestion and hæmorrhoids are apt to be irritated. If there has been an overdose and these symptoms are aggravated, it would be sufficient to give large draughts of demulcents, and an anodyne in the form of an opium suppository. It is stated that such phenomena do not follow the administration of aloin, which requires only about one-third or one-half the dose in order to produce the physiological effects of aloes.

* This preparation is nearly three times the strength of the tincture of aloes of the United States Pharmacopœia of 1870, and the strength of the menstruum has been more than doubled. It is about the same strength as the English tincture (P. Br.), but only half the strength of the German and the French.

† Commonly known by the name of hiera picra, or "hickory pickory" by the vulgar.

Therapy.—Aloes, or aloin, is a slowly-acting purgative, and, therefore, should generally be administered at bed-time; in this way it operates during sleep, and griping is avoided. For the same purpose it is well to combine it with a carminative, as in the compound decoction, or the compound rhubarb-pill, which is a useful purgative for an ordinary attack of constipation. The following are likewise excellent formulæ to use in the same class of cases:—

℞ Vini aloës,
Ext. cascaræ sagradæ fl., ... āā f℥vj.
Elix. aromatic., ... q. s. ad f℥vj.
M. Sig.: A tablespoonful morning and evening.

℞ Pil. aloës et myrrhæ, ... ʒiij.
Pulv. glycyrrhizæ comp., ... ℥iv.
M. Sig.: From one-half to three teaspoonfuls in water or milk, early in the morning or on retiring.

The pill form is also useful for the expulsion of ascarides, which are apt to lodge in the cæcum; with this may be combined injections of aloes in solution (ʒj to Oj) and irrigation of the bowel. For the latter purpose, in young children, a soft catheter can be inserted beyond the sigmoid flexure of the colon. In anæmia affecting young girls (chlorosis), Sir Andrew Clarke has shown that constipation has much to do with its causation; he calls it fæcal intoxication. Here aloes, in combination with iron, is of much service.

℞ Aloës purificatæ, ... ʒj.
Massæ ferri carbonatis, ... gr. xl.
Pulv. aromatici, ... gr. xx.
M. et ft. pil. no. xx.
Sig.: Take one or two at bed-hour.

Sir Andrew Clarke's pill is likewise valuable:—

℞ Aloin.,
Ferri sulph. exsic.,
Ext. bellad.,
Ext. nucis vom.,
Pulv. ipecac.,
Pulv. myrrh,
Saponis, ... āā gr. ss.
M. et ft. pil. no. j.
Sig.: One pill one hour before last meal, should the bowels not act during the day.

Ipecac is omitted if there is any cardiac weakness.

In cases of hysteria, with anæmia and constipation, the pills of aloes, with asafetida, may be given (3 to 6 daily). These have also a carminative effect. An atonic condition of the muscular coat of the large intestine may allow its contents to accumulate, to press upon the com-

mon bile-duct and obstruct the passage of the biliary secretion into the upper bowel. This condition and the jaundice which is its result are relieved by the administration of aloes, with which belladonna and strychnine, or hyoscyamus and ipecacuanha, may be very usefully combined in such formulæ as the following:—

℞ Aloës purificatæ, ... ℨss.
Extr. belladonnæ alc., ... gr. j.
Strychninæ sulphatis, ... gr. ss.
M. et ft. pil. no. xij.
Sig.: A pill three times a day.

℞ Aloini, ... gr. j.
Ext. hyoscyami alc., ... gr. x.
Ext. ignatiæ, ... gr. j.
Pulv. ipecacuanhæ, ... gr. ij.
M. et ft. pil. no. x.
Sig.: A pill three times a day.

Aloes is an excellent emmenagogue; given for several days before the expected period, it is generally successful, especially when employed thus:—

℞ Aloini, ... gr. ij.
Mass. ferri carb., ... gr. xxxvj.
Apiol., ... ♏lx.
M. et ft. capsulæ no. xij.
Sig.: A capsule morning and evening for five or six days before the menstrual period.

In scanty menstruation, depending upon anæmia, the chalybeates should also be pushed, preferably using the preparations of iron which are not constipating, such as the dialyzed iron, or the carbonate or pyrophosphate, rather than the sulphate which is contained in the officinal pill. When intestinal indigestion is caused by deficient secretion of bile, aloes is of special value, and enjoys a reputation as an ingredient in "dinner-pills" of many kinds. Where the mental symptoms of dyspepsia, drowsiness, depression of spirits, or melancholia, are marked, the use of a good dinner-pill immediately after dinner is often effective.

In cases where there are hæmorrhoids, the aloes sometimes irritates them; under such circumstances the proper course to pursue would not be to neglect such a valuable remedy, but to operate surgically upon the piles and remove them The passive turgescence of the inferior hæmorrhoidal vessels, however, is not infrequently relieved by the use of aloes. Whitla speaks of having obtained surprising results in obstinate diarrhœa in children or adults from the administration of a few 1- to 2-ounce doses of the compound decoction of aloes. Prescribe the following:—

℞ Aloini, ... gr. ij.
Sulphuris subl., ... gr. c.
Ext. belladonnæ alc., ... gr. ij.

M. et ft. capsulæ no. xx.
Sig.: A capsule three times a day.

In small doses aloes acts as a hepatic and intestinal tonic, and, where diarrhœa is maintained by the action of germs of fermentation, the increased flow of bile exerts an antiseptic effect and the diarrhœa may be checked after a preliminary purge; although the rule is that, where diarrhœa is due to irritation from abnormal condition of the contents, the cause of disturbance should be removed by a more prompt cathartic, such as sulphate of magnesia or the citrate, or by an antiseptic purgative like calomel or blue mass. Aloetic purgatives should be used with care during pregnancy and lactation. The milk of women taking aloes will purge babes whom they suckle. Aloes may be used as a derivative in cerebral disorders.

A glycerole of aloes is prepared by evaporating the tincture and adding glycerin. This mixture may be applied to fissures, abrasions, and ulcers. The bitter taste of aloes is sometimes utilized by applying a solution to the finger-ends of children in order to break them of the habit of biting their nails or sucking their thumbs, or to the nipple when it is desired to wean an infant, which is unnecessary cruelty. The compound tincture of benzoin contains 2 per cent. of aloes. This fact should be borne in mind when treating cracked nipples with this preparation, as the infant may be weaned too early.

ALTHEA (U. S. P.).—Marsh-Mallow.

Preparations.

Syrupus Altheæ (U. S. P.).—Syrup of Althea (4 per cent.).
Confectio Altheæ.—Marsh-Mallow Drops.

Pharmacology.—The root of Althea officinalis (Malvaceæ) contains a mucilaginous principle, with about 2 per cent. of asparagin, but no tannin. Althea is a constituent in massa hydrargyri (blue mass) and phosphorus pills.

Therapy.—The powdered root may be used as a poultice. It is slightly diuretic, on account of the asparagin, which would make it of service in children's diseases in the form of a fresh infusion, especially in Bright's disease. The confections are useful in sore throat, in scarlatina and diphtheria. The syrup is an agreeable addition to cough mixtures. Dose, indefinite. Althea combined with benzoinated lard is a bland dressing for skin diseases. Asparagin has been recommended as a diuretic in gout and cardiac dropsy, in doses of gr. i–ij.

ALUMEN (U. S. P.).—**Alum.**

Preparations.

Alumen Exsiccatum (U. S. P.).—Dried Alum. *Dose*, gr. i–v.
Aluminii Hydras (U. S. P.).—Hydrate of Aluminium. *Dose*, gr. iii–xx.
Aluminii Sulphas (U. S. P.).—Sulphate of Aluminium. For external use.
Alumen Ammonio-ferricum.—Iron Alum. *Dose*, gr. ii–x.
Alumen Glyceritum.—Glycerite of Alum (20-per-cent. alum).
Aluminii Oleatum.—Oleate of Aluminium. (See the Oleates.)

Pharmacology.—The officinal alum is potash alum (aluminium and potassium sulphate). It is in the form of translucent, white, octahedral crystals, with a sweetish, astringent taste and acid reaction. It contains water of crystallization, which can be driven off by heat, forming dried alum. Ammonia alum, which was formerly the officinal alum, has very much the same properties, and is often dispensed for alum. The metal aluminium is not officinal. In appearance it is like silver, but is much lighter and more durable; is useful for making instruments, in place of silver.

Physiological Action.—Dried alum is astringent, and is a mild escharotic for fungous granulations. The glycerite of alum is useful in cases of tonsillitis or pharyngitis of subacute character. In solution, alum condenses tissues by coagulating their albumin, and acts as an astringent.

Therapy.—It checks excessive sweating in phthisis when applied with a sponge (ʒj to Oj of whisky and water). It is used as an injection in leucorrhœa and in gonorrhœa, and a watery solution of the glycerite is useful as a collyrium in conjunctivitis. In the latter affection **alum-curd** is sometimes applied ($\frac{1}{2}$ drachm beaten up with the albumin of a fresh egg). Applied locally in the form of powder or saturated solution, alum is an excellent styptic. A most useful alum styptic combination is the following:—

℞ Aluminis glyceriti,
Spt. vini rectificati,
Lin. saponis, ... āā f℥ij.—M.

Compresses soaked in the prescription just referred to, or a solution of alum, may be used to restrain capillary hæmorrhage from wounds, bleeding from the gums, or leech-bites. In epistaxis a plug of cotton moistened in alum-water may be passed into the nares; a solution may be thrown in by injection or powdered alum may be snuffed. These measures will frequently prove successful. In chronic pharyngitis, tonsillitis, and nasal catarrh the local action of powdered alum is beneficial. A prescription composed thus is often effectual:—

℞ Acidi carbolici,	♏iij.
Aluminis glyceriti,	f℥iij.
Aristol,	ʒss.

M. Sig.: Apply with cotton or a camel's hair brush once or twice a day over the surface.

It may also be used in solution as a gargle with good effect. An injection of alum is a serviceable astringent in hæmorrhage from the rectum, or in gonorrhœa. For gleet, the following formula is recommended:—

℞ Pulv. aluminis,	ʒij.
Ext. geranii maculati,	f℥ss.
Aquæ rosæ,	f℥ivss.—M.

A lotion containing alum may be successfully employed in the prolapsed bowel of children. A drachm or two of alum to the pint of water, or alcohol, is a beneficial application in hyperidrosis. It is said that 10 grains of alum, placed dry upon the tongue, will sometimes arrest a paroxysm of asthma (Ringer). According to Ringer, many cases of chronic ozæna are rapidly relieved by irrigating the nasal chambers with a solution containing a drachm of alum to the pint of water. The discharge is checked and the fœtor removed. Pruritus of the vulva sometimes yields to an alum solution. The local astringent action of this substance is sometimes found beneficial in purpura. An ointment containing alum is often useful in herpes, and the same preparation removes the offensive odor of bromidrosis. The following formulæ are of service in the diseases just named:—

℞ Pulv. aluminis,	ʒj.
Salol,	ʒss.
Bismuth. subnit.,	ʒj.
Ungt. zinci oxidi,	℥j.—M.

℞ Pulv. aluminis,	℥ss.
Glycerini,	f℥j.
Aquæ hamamelidis,	f℥v.—M.

As an emetic in croup, a heaping teaspoonful of alum may be dissolved in 4 ounces of simple syrup, of which a teaspoonful given every fifteen minutes until vomiting is produced. It is useful in bronchorrhœa, and in whooping-cough, especially where the secretion is excessive. Given internally, alum checks hæmorrhage and profuse discharges. Whitla esteems it the best remedy in hæmorrhage of the bowel due to typhoid fever. It may be given with good result in the hematemesis dependent upon cirrhosis of the liver and in hæmoptysis. The local action of alum may be aided by its internal administration in the night-sweats of phthisis. It checks excessive production of mucus in chronic gastric and intestinal catarrh, and Bartholow asserts that it relieves the pain of gastralgia and enteralgia. It is an efficient remedy in diarrhœa.

Whitla considers the internal exhibition of alum of service in leucorrhœa. The following formulæ are advised :—

℞ Pulveris aluminis, ... ʒiij.
Acidi sulph. arom., ... fʒj.
Ext. geranii maculati fl., ... f℥ij.
Syrup. zingiberis, ... f℥iij.

M. Sig.: One to two teaspoonfuls in water every half hour or hour until hæmorrhage is arrested. For hæmoptysis, hæmaturia, menorrhagia, and uterine hæmorrhage.

℞ Pulveris aluminis,
Salol, ... āā gr. c.

M. et ft. capsulæ no. xx.

Sig.: A capsule three or four times a day. Employ especially in catarrh of the bladder and prostatitis.

℞ Pulveris aluminis, ... gr. cc.
Tinct. kino, ... ℥iss.
Tinct. opii camph., ... f℥j.
Acidi sulph. arom., ... fʒj.
Spt. vini gallici, ... q. s. ad f℥v.

M. One to two teaspoonfuls in water every three or four hours. Serviceable in chronic diarrhœa, dysentery, and in hæmaturia.

In comparatively large doses (gr. xl–ʒj), alum acts as a purgative, and has been used in colica pictonum. Iron alum has been employed in intermittent hæmaturia. For boils in the ear, a solution of aluminium acetate (25 per cent.) may be dropped into the ear frequently, and the canal plugged with cotton. Alum is sometimes used as an adulterant of baking-powders, and, when constantly used, produces indigestion.

The aluminium salts are antiseptic and can be used as injections for leucorrhœa (gr. x–℥j), and saturated solutions are mild caustics. The oleate of aluminium arrests morbid discharges.

ALVELOZ is the milky juice of Euphorbia heterodoxa, belonging to the Euphorbiaceæ, a native of Brazil.

The irritating effects of the juice of plants of this genus is very marked in alveloz, which is said to act as a caustic upon the skin very much like chloride of zinc. It has been used in treating cancerous and syphilitic lesions with asserted success, and the application is comparatively painless.

AMBRAGRISEA.—Ambergris is an odorous, fatty substance, found in large masses floating upon the water, and is believed to be produced in the intestines of the spermaceti whale. It has a consistence like wax, softening at the temperature of the hand, and melting below the boiling-point of water; it is almost entirely volatilized by heat, and is inflammable. In composition it is like cholesterin, and is not saponifiable. It is

believed to have some antispasmodic effects, and is officinal in the French Codex as a 10-per-cent. tincture. The dose of ambergris is gr. v–ʒj. It is used very largely in perfumery on account of its agreeable odor.

AMMONIACUM (U. S. P.).—**Gum Ammoniac.**

Preparations.

Mistura Ammoniaci (U. S. P.).—Ammoniac Mixture, 4 per cent. *Dose*, f ʒi–iv.

Emplastrum Ammoniaci (U. S. P.).—Ammoniac Plaster, made with the aid of acetic acid.

Emplastrum Ammoniaci cum Hydrargyro (U. S. P.).—Ammoniac and Mercury Plaster (ammoniac, 72; mercury, 18; with lead plaster, sublimed sulphur, olive-oil, and acetic acid).

Pilulæ Ammoniaci.—Ammoniac Pills (ammoniac, gr. ij; ginger, gr. ij; squill, gr. ss; with soap, q. s.).

Pharmacology.—Ammoniac is a gum-resin obtained from Dorema ammoniacum (Umbelliferæ, Orthospermæ), containing a volatile oil. It forms a milky emulsion when rubbed up with water.

Therapy.—It is a stimulating expectorant and laxative, and resembles asafœtida in its effects upon the system. It has been used, with alkalies, to relieve chronic bronchitis and asthma. It is especially beneficial in chronic bronchitis associated with emphysema, or occurring in aged persons. The plasters are useful in glandular and joint swellings. By fusing ammoniac and other resins with caustic potassa resorcin is obtained, which is a valuable antiseptic. An alcoholic extract of ammoniac is fused with three times its weight of potassa, and dissolving the resulting homogeneous mass in water, slightly acidulating with sulphuric acid, following and agitating with ether. On evaporating the ether, impure resorcin is left, which is purified by recrystallization. (See Resorcin.)

AMMONIUM.—Metallic ammonium has not yet been isolated. It is known only in its combinations, which are numerous and important. According to Ampère, its constitution is NH_4, therefore not a simple but a compound radical, and as such it forms salts which are analogous to potassium salts.

Preparations (liquid).

Aqua Ammoniæ (U. S. P.).—Contains 10 per cent. gaseous ammonia. *Dose*, ♏ii–x.

Aqua Ammoniæ Fortior (U. S. P.).—Twenty-eight per cent. ammonia. External use.

Linimentum Ammoniæ (U. S. P.).—Contains water of ammonia 30, cottonseed-oil 70 parts.

Spiritus Ammoniæ (U. S. P.).—Spirit of Ammonia, or Hartshorn (10 per cent.). *Dose*, ♏v–xv.

Spiritus Ammoniæ Aromaticus (U. S. P.).—Aromatic Spirit of Ammonia (21 per cent. ammonium carbonate). *Dose*, f ʒss–ij.

Liquor Ammonii Anisatus.—Ammoniated Spirit of Anisi. Same use as preceding.

Liquor Ammonii Acetatis (U. S. P.).—Solution of Acetate of Ammonium, Spirits of Mindererus. *Dose*, f℥i–iv.

Tinctura Guaiaci Ammoniata (U. S. P.). *Dose*, ♏xxx–lx.

Tinctura Valerianæ Ammoniata (U. S. P.). *Dose*, f℥ss–j.

Preparations (solid).

Ammonii Benzoas (U. S. P.).—Benzoate of Ammonium. *Dose*, gr. ii–x.

Ammonii Bromidum (U. S. P.).—Bromide of Ammonium. *Dose*, gr. x–xv.

Ammonii Carbonas (U. S. P.).—Carbonate of Ammonium. *Dose*, gr. ii–v or xx.

Ammonii Chloridum (U. S. P.).—Chloride of Ammonium. *Dose*, gr. v–xx.

Ammonii Iodidum (U. S. P.).—Iodide of Ammonium. *Dose*, gr. v–x.

Ammonii Nitras (U. S. P.).—Nitrate of Ammonium.

Ammonii Sulphas (U. S. P.).—Sulphate of Ammonium.

Ammonii Phosphas (U. S. P.).—Phosphate of Ammonium. *Dose*, gr. iiss–xx.

Ammonii Valerianas (U. S. P.).—Valerianate of Ammonium. *Dose*, gr. ii–v.

Trochisci Ammonii Chloridi (U. S. P.).—Troches of Ammonium Chloride (gr. ij).

Glycyrrhizinum Ammoniatum (U. S. P.).—Ammoniated Glycyrrhizin. *Dose*, gr. ss–v.

Hydrargyrum Ammoniatum (U. S. P.).—Used only externally.

Ammonium Boras.—Borate of Ammonium. *Dose*, gr. iv.

Pharmacology and Physiological Action.—Ammonia is a gaseous body, highly irritating to the air-passages, even suffocating, and may cause inflammation with œdema of the glottis. It stimulates the trifacial nerve, increases the blood-tension by reflex action upon the vasomotor centre, and prevents syncope. If applied to the skin it is rubefacient, and, if diffusion be prevented, it will soften and vesicate the skin. The strong solution also produces vesication and softens the cuticle. The chloride of ammonium, on the other hand, is cooling and absorbent. The chloride, after absorption, hastens epithelial proliferation of the bronchial mucous membrane and liquefies thickened mucous secretions. The carbonate is probably decomposed in the digestive tract, and its effects are identical with those of the gas or of aqua ammonia, in stimulating the heart and circulation.

Ammonia acts upon the ganglionic nervous system especially, and has little effect upon the higher centres, thus differing from alcohol. It increases the functional activity of the spinal cord and is a promptly acting cardiac stimulant. Blood-pressure is moderately increased, but in large doses ammonia interferes with the oxygen-carrying power of the red blood-corpuscles, and if long continued produces emaciation. Again, the protracted use of ammonia, by neutralizing the gastric juice, enfeebles digestion, and in this manner also leads to emaciation. It may originate a gastro-intestinal catarrh. Injected into the blood-vessels, the blood-corpuscles become dissolved and the blood remains fluid. Ammonia likewise assists in maintaining the solution of the fibrin of the blood. Such injections are likely to be followed by vomiting, and the carbonate may be given for the same purpose by the mouth, in

doses of 20 to 30 grains. Ammonia increases the secretions, not only of the bronchial mucous membranes, but also the intestinal, and may set up diarrhœa. The solution of acetate of ammonium acts upon the skin, especially in fever. Ammonia has no special action upon the kidneys, except that the urea is increased by oxidation of ammonia (Bence Jones); it is eliminated especially by the kidneys, broncho-pulmonary tract, and skin. Ammonia possesses marked antiseptic virtues.

Poisoning.—As the water of ammonia, or spirit of "hartshorn," is found in every household, cases of poisoning by accidental swallowing not rarely occur. When the stronger solutions are swallowed there is great distress, burning pain along the œsophagus and in the stomach, with choking sensations from inhaling the gas or the admission of a few drops into the larynx. After death there are evidences of softening and acute inflammation of the stomach.

Treatment.—Vomiting is likely to occur immediately, but, if not, the administration of large quantities of bland liquid, such as oil or milk, would be serviceable, and if the solution of the gas has been taken it may be neutralized with vinegar or lemon-juice. Treatment should be promptly instituted in order to avoid such a degree of inflammation as would produce stricture of the œsophagus. If the patient is in a state of shock, hot infusion of coffee may be administered, and tincture of digitalis given hypodermatically.

Therapy.—The local uses of ammonia have been already intimated. In sprains, bruises, and old rheumatic swellings, the liniment is of service, especially if some oil of turpentine or chloroform be added.

The water of ammonia may very serviceably enter into the composition of a stimulating application in alopecia. In the headache which attends disordered menstruation or the menopause, Dr. Tilt has seen Raspail's sedative lotion afford much relief. This preparation contains 2 ounces of liquor ammoniæ, 2 ounces of common salt, 2½ drachms of spirits of camphor, and 2 pints of water. The liquid may be applied upon a sponge or linen cloth. Weak solutions of ammonia will sometimes relieve the itching of urticaria. For this purpose 2 drachms of the officinal solution of ammonia may be added to a pint of water, or the carbonate of ammonia may be employed in the strength of 1 drachm to 4 ounces of water. The following combinations of ammonia are also of service for external use:—

℞ Aquæ ammoniæ,
Ext. arnicæ fl.,
Lin. saponis,
Olei terebinthinæ, ... āā f℥ij.

M. Sig.: Rub in well several times a day. For rheumatism, bruises, and sprains.

℞ Lin. ammoniæ,	f℥ij.
Spt. chloroformi,	f℥j.
Lin. menthol,*	f℥ij.
Tinct. opii,	f℥j.

M. Sig.: Apply well over the surface when necessary for lumbago, neuralgia, and sciatica.

℞ Spt. ammon. aromat.,	
Tinct. capsici,	āā f℥ss.
Spt. lavandulæ,	f℥j.
Tinct. nucis vomicæ,	f℥ss.
Lin. camphoræ,	f℥iiss.

M. Sig.: Apply with friction to the scalp for loss of hair and for dandruff.

Spirit of ammonia is a good application to wounds caused by stings of insects or snake-bites. In the latter case, the water of ammonia can also be injected into a vein in order to counteract the depressing effects of the venom. In poisoning by sewer-gas, intra-venous injection of ammonia has saved life. The solution of chloride of ammonium (ℨii–iv–Oj) removes ecchymosis from contusions. This solution is applicable likewise to epididymitis after the acute stage has subsided. It is, in fact, an excellent dressing in the latter stages of superficial inflammation, and promotes the absorption of exudation. In neuralgia, thimble-blistering may be practiced over the painful spots of Valleix, by dropping some stronger aqua ammoniæ upon absorbent cotton and confining it with a watch-glass or thimble in contact with the skin.

Ammonia is invaluable as a cardiac and nervous stimulant in pneumonia and all typhoid conditions, in poisoning by prussic acid, in syncope, and in heat exhaustion. The carbonate is the most eligible form, given in doses of gr. v–x. In capillary bronchitis in infants, the following answers a good purpose:—

℞ Ammonii carbonatis,	gr. xii–xxiv.
Syrup. tolutani,	fℨiv.
Liq. ammonii acetatis,	f℥iss.

M. Sig.: Give a teaspoonful every hour or every two hours.

According to Dr. Beverley Robinson, the carbonate of ammonium, in rather large and frequently-repeated doses, is very efficient in aborting a cold. The following formula is often most efficient as an expectorant, especially in the late stage of bronchitis:—

℞ Ammonii carb.,	ℨj.
Syr. senegæ,	ℨiv.
Vini ipecac,	ℨiij.
Syr. tolutani,	℥j.
Spt. chloroformi,	ℨiij.
Aq. camphoræ,	ad ℥iv.

M. Sig.: One to two teaspoonfuls every hour or two until relieved.

* Linimentum menthol as suggested by Martindale (see The Extra Pharmacopœia, London) is composed of menthol, 3 parts; chloroform, 4 parts; and olive-oil q. s. to make 16 parts.

The value of carbonate of ammonium in scarlet fever has been extolled by Peart, Wilkinson, and Witt. It was employed in 3- to 5-grain doses, hourly, or at longer intervals, according to the severity of the case. It reduces fever and cerebral excitement and promotes sleep. The solution of the acetate of ammonium is also highly recommended in scarlatina. The plan is to administer the remedy in large doses, which has been found to be well borne, even by children. The carbonate has likewise been employed in measles, in which disease Ringer states that he has used it largely with considerable benefit. The same salt is valued by some practitioners in the treatment of small-pox and erysipelas.

Delirium tremens, being usually associated with cerebral anæmia and weakened cardiac action, may be benefited by the use of carbonate of ammonium. Its value in this affection is conspicuous, according to the prominence of the symptoms just mentioned.

The carbonate and the acetate of ammonium have been used in diabetes mellitus. Eichhorst states that in two of his cases the use of the carbonate was followed by rapid disappearance of the sugar from the urine; yet the progress of the pulmonary lesions was not interrupted, and speedily proved fatal.

Special Applications.—The aromatic spirit of ammonia may be given in typhoid fever, in doses of ʒss–j, in order to sustain the circulation (Da Costa), or in cough mixtures in place of the carbonate. The aromatic spirit of ammonia is a good antacid in hyperacidity of the stomach. It is likewise of service in the sour stomach and tympanites which not infrequently occur in hysterical women. Nervous headache is often relieved by the same preparation. It may be administered thus as a hepatic stimulant:—

℞ Ammonii chlor.,	ʒiij.
Sodii chlorid.,	ʒj.
Succi tarax.,	f℥ij.
Decocti aloës co.,	ad f℥viij.

M. Sig.: A dessert- to a table- spoonful in water three or four times a day.

The chloride has a special action upon the liver, increasing the flow of bile (Ringer). It is, therefore, useful in torpor of the liver, sick-headache, biliousness, and also in jaundice due to obstruction of the gall-ducts. It has some reputation as an emmenagogue. The chloride of ammonium is esteemed of value in catarrh of the stomach and bowels, and Bartholow considers it useful in the first stage of cirrhosis.

In myalgia and neuralgia this salt is capable of affording relief, and should be given in rapidly-increasing doses until the effect is obtained or the system becomes intolerant of the remedy. It has also been used in intermittent hæmaturia. It is best given in capsules, on account of its

nauseating, sea-water taste. In bronchitis in its first stage, with deficient secretion, it may be combined as follows :—

℞

Ammonii chloridi,	ʒij.
Potassii iodidi,	gr. xvj.
Tinct. ipecacuanhæ,	♏xxxij.
Mist. glycyrrhizæ comp.,	q. s. ad f℥iv.

M. Sig.: Dose, a tablespoonful every four hours.

This formula is of special service in acute catarrhal pneumonia. The chloride is particularly valuable in chronic bronchitis accompanied by profuse secretion. In catarrhal conditions of the respiratory tract Krakauer recommends the use of chloride of ammonium in the form of a spray. The carbonate of ammonia may also be used as an emetic in such cases. In the later stages of pneumonia expectoration is promoted by the same remedy. Liquor ammonii acetatis is one of our most reliable diaphoretics, and enters into the composition of many fever mixtures :—

℞

Ext. aconiti fld.,	gtt. iij.
Spt. chloroformi,	fʒiv.
Liq. ammonii acetatis,	f℥iiss.

M. Sig.: Give a dessertspoonful every two or three hours in fever.

The bromide has a special influence over whooping-cough, and may be substituted for the potash salt in epilepsy and nervous affections. A double salt, the bromide of ammonium and rubidium, has recently been introduced as a remedy for epilepsy. The substance is readily soluble in water. Its dose is that of the other bromides. Active doses are from 30 grains upward, and as much as 2 drachms daily, or even more, may be given, dissolved in syrup of lemon and water. Laufenauer has used it in all the epileptic states with the exception of hystero-epilepsy.* In acute rheumatism with nervous symptoms, Da Costa reported good results from the use of ammonium bromide (gr. xx–xl) several times daily.

A very beneficial prescription for insomnia and in gouty subjects is :

℞

Sodii bromidi,	ʒvss.
Tinct. lupulini,	f℥ij.
Spt. chloroformi,	fʒij.
Aquæ camphoræ,	f℥ij.

M. Sig.: Two teaspoonfuls in water every hour or two when necessary.

The valerianate enjoys some reputation for its influence over hysterical manifestations, and may be given in capsules (5 to 20 grains) or as an elixir† (not officinal) :—

* Medical Bulletin, July, 1890.

† In the National Formulary the Elixir of Valerianate of Ammonia contains vanilla and a little chloroform to cover the odor and taste of the salt, of which there are present 2 grains to each drachm, as in the formula above.

℞ Ammonii valerianatis, ... gr. c.
Elixir aurantii rubri, ... f℥viij.
Aquæ ammonii, ... q. s. ad react. neut.
M. Sig.: Dose, a tablespoonful.

Of the remaining salts little need be said. The phosphate is diuretic and has been used in gout, which may be connected with deficient excretion of urea. The benzoate, where the urine is alkaline, as in cystitis, has advocates, as it is excreted as hippuric acid, and thus prevents phosphatic deposits. The nitrate is only used to prepare nitrous-oxide gas, which it yields by exposure to heat. The sulphate is used in making other salts. The iodide may be employed in syphilitic affections, where the other iodides are too depressing.

Hypodermatically, aqua ammoniæ may be administered in shock, in chloroform narcosis, in poisoning by hydrocyanic acid or hydrogen sulphide, and also in heart-clot, thrombosis, and snake-poisoning. Where a prompt effect is needed, the remedy should be injected directly into a vein (♏x–xx.).

AMYGDALA.—Almond.

The United States Pharmacopœia recognizes two varieties of almond (Rosaceæ, Amygdaleæ),—(1) the seed of Amygdalus communis; variety, Amara; and (2) the seed of Amygdalus communis; variety, Dulcis. Each has its own officinal preparations.

Preparations.

Oleum Amygdalæ Amaræ (U. S. P.).—Oil of Bitter Almond. *Dose*, ♏¼–j.
Aqua Amygdalæ Amaræ (U. S. P.).—Bitter-Almond Water. *Dose*, f℥ss.
Syrupus Amygdalæ (U. S. P.).—Syrup of Almond, "Orgeat" Syrup. *Dose*, fʒii–f℥ss.
Mistura Amygdalæ (U. S. P.).—Almond Mixture. *Dose*, fʒii–f℥ss.
Oleum Amygdalæ Expressum (U. S. P.).—Expressed Oil of Almond. *Dose*, fʒii–f℥ss.
Unguentum Aquæ Rosæ (U. S. P.).—Ointment of Rose-Water, "Cold Cream" (expressed oil of almond 50, spermaceti 10, white wax 10, rose-water 30 parts).

Pharmacology.—Both varieties of almond contain fixed oil and emulsin, but only the bitter variety has also amygdalin. Hydrocyanic acid is formed when amygdalin and emulsin react upon each other, and it is to the presence of the acid thus formed that the sedative and antispasmodic effects of oil of bitter almond are due. Its toxic effects are also identical, and call for the same treatment as hydrocyanic acid.

Therapy.—In prescribing, the volatile oil of bitter almond must not be confounded with the fixed oil obtained from either variety by expression, the latter being a bland application, especially in the form of ung. aquæ rosæ, to irritable skin or chapped hands or lips. In doses of ʒj or ij it is laxative, and may be used as a substitute for olive-oil. The oil of bitter almond has been employed in emulsion as a local appli-

cation in pruritus, and internally for the same purposes as hydrocyanic-acid solution. The mixture is a soothing application to inflamed skin, and it may be combined according to these formulæ:—

℞ Mist. amygdalæ, ... f℥j.
Bismuth. subnit., ... ʒj.
Aristol, ... ʒj.
M. Sig.: For local application to freckles and skin pigmentations.

℞ Mist. amygdalæ, ... f℥j.
Hydrarg. chlor. corros., ... gr. iij.
Ammon. chloridi, ... gr. iv.
M. Sig.: Valuable in skin pigmentations.

℞ Hydrarg. chlor. corros., ... gr. i–ij.
Mist. amygdalæ, ... f℥iv.
M. Sig.: For external use in acne rosacea.

Bitter-almond water is a good vehicle in which to administer narcotic drugs. The syrup of almond may be appropriately added to cough mixtures. Almond mixture is an agreeable demulcent, and may very well be employed as a vehicle of more active remedies.

AMYL NITRIS (U. S. P.).—**Nitrite of Amyl.**

Dose, ♏ ¼–j, internally; by inhalation, gtt. iii–v.

Pharmacology.—A clear, pale-yellowish liquid, of an ethereal, fruity odor, an aromatic taste, and a neutral or slightly-acid reaction. Insoluble in water, but soluble in alcohol, ether, and chloroform, in all proportions. It volatilizes at ordinary temperatures, and should be kept in a glass-stoppered bottle, or in small glass pearls, each containing 3 or 5 minims. It results from the reaction of nitric acid upon amylic alcohol, and may be contaminated with nitric or hydrocyanic acid.

Physiological Action.—No local effects are ascribed to this remedy, but when taken internally, by the digestive tract, or by inhalation of its odor, very remarkable phenomena are produced. There is at once observed a flushing of the face, with fullness and throbbing of the temporal vessels; the patient complaining of headache, fullness, and oppression, with giddiness and confusion of ideas. The reflex excitability of the cord is diminished. The brain is indirectly influenced, and its functions exalted by the temporary flushing with blood. The action of the heart becomes excessively rapid, with weakening of the pulse and marked lowering of arterial tension, owing to the general enlargement of the vessels, due to action of the drug upon the muscular coats of the arteries, and not to the nervous system or vasomotor centres. Oxidation is diminished, and the arterial and venous blood both become of the same dark color. Respiration and temperature are both reduced. Sugar appears

in the urine after inhalation, probably as the result of flushing the liver with blood. It increases the flow of urine, possibly, in the same way, or because the liver-sugar may act as a diuretic. In poisoning from amyl nitrite the blood assumes a characteristic chocolate color, due to the formation of methæmoglobin.

Therapy.—The application of the knowledge of physiological action to therapeutics has probably never been more direct and logical than the recommendation of Brunton to treat the paroxysms of angina pectoris with amyl nitrite, in which clinical experience has shown the truthfulness of the hypothesis. Whether the relief be due to lowering of arterial tension, as Brunton asserts, or to the alleviation of the neuralgic condition, as claimed by Johnson, is not very material, since by inhalation of a few drops of this remedy the patient has complete control over the attacks. In asthma, where the spasmodic element is strong, amyl nitrite promptly affords amelioration. Amyl nitrite can often be resorted to with benefit for sea-sickness, especially in this formula, given by Martindale :—

℞ Amyl nitritis, ... ♏xvj.
Spirit. rectificat., ... f℥ij.
Misce et adde
Pulv. tragacanthæ, ... gr. vj.
Aquæ destillatæ, ... q. s. ad f℥iv.

The powdered gum tragacanth should be in a dry four-ounce bottle, into which the amyl solution is poured, and the water added gradually afterward. Shake well. Dose, one or two drachms.

In epilepsy, tetanus, neuralgia, chloroform narcosis, and in strychnine poisoning, amyl has been tried with gratifying results; in whooping-cough it has failed. Benefit results from its inhalation in neuralgic dysmenorrhœa. In anæmic epileptics, the inhalation before a fit sometimes prevents it. The remedy should not be given to plethoric epileptics, nor to elderly people with brittle arteries.

Nitro-glycerin, *trinitro-glycerin*, or *glonoin* has the same physiological effects as amyl nitrite, but is usually administered in solution (alcoholic, 1–100). The dose of the freshly-made centesimal solution is $\frac{1}{2}$ to 2 or 3 drops, which is preferable to the tablets of the British Pharmacopœia, each containing gr. $\frac{1}{100}$. The action is slower but more permanent than amyl. Murrell praises this remedy highly, not only for typical angina, but for breathlessness and attacks of pseudo-angina. Da Costa has given it in the form of Bright's disease attended by high arterial tension (cirrhotic kidney), in the following combination* :—

* These can be obtained from H. K. Mulford & Co., Philadelphia, in the form of soluble compressed triturates.

℞ Nitroglycerini,	gr. $\frac{1}{100}$.
Tr. digitalis,	♏ij.
Tr. strophanthi,	♏ij
Tr. belladonnæ,	♏ss.

M. et ft. tabella.
Sig.: Take one every six hours until effect upon the pulse is obtained.

In the treatment of angina pectoris and severe asthma, Hoffman* recommends subcutaneous injections of nitro-glycerin in dose of $\frac{1}{120}$ to $\frac{1}{60}$ grain. He claims remarkable results from these injections, without any objectionable after-effects.

On account of the explosive properties of nitro-glycerin, it would be safer not to accumulate too large a number of the tablets, nor to shake them violently. This objection, says Murrell,† does not apply to the form in which nitro-glycerin is ordinarily dispensed. The 1-per-cent. solution, he adds, is perfectly safe, and may be used without fear; in fact, most chemists keep a 5-per-cent. solution. The same authority also gives a series of experiments made by himself in hammering and bringing a red-hot wire in contact with M. Martindale's pills of nitro-glycerin, thus demonstrating their safety. All pills and tablets of nitro-glycerin may not be so safe as those he referred to.

Antagonists.—The physiological antagonists to the action of amyl and nitro-glycerin are strychnine, belladonna, sclerotinic acid, and, in general, those remedies which raise arterial tension and diminish blood-supply to the great centres by producing contraction of blood-vessels. In case of unpleasant or serious symptoms after its use, the exhibition of ammonia by inhalation and by the mouth, the hypodermatic injection of atropine or ether, with cold water or ice-bag to the head, mustard poultice to the epigastric region, or to the extremities, keeping the patient warm and in the recumbent posture, will very soon be followed by relief, as the symptoms are usually quite evanescent.

Amyl valerianate is an active preparation, which is regarded as a valuable hypnotic and antispasmodic. It is combined according to Dr. W. F. Wade's formula, by taking 1 part of valerianate of amyl to 19 of alcohol, to which is added acetate of amyl in the proportion of 1 minim to 2 ounces. (Dose, ♏vi–viij.) This dissolves cholesterin readily, and is considered better in cases of gall-stone than either chloroform or ether.

AMYLENE HYDRAS.—Hydrate of amylene is tertiary amyl alcohol (dimethylethylcarbinol).

Dose, ♏x–xxx.

Pharmacology.—It is a mobile, colorless liquid, with a camphor-like odor. It boils at 102.5° C. (216.5° F.), and at 200° C. (392° F.) is

* Pharmaceutical Journal and Transactions, June 28, 1890.
† Nitro-glycerin in Angina Pectoris, by W. Murrell, M.D., F.R.C.P. London, 1882.

decomposed into amylene and water. It forms compounds with chlorine, bromine, and with iodine. Oxidation converts it into acetic acid and acetone. Soluble in alcohol in all proportions, and in water 1 to 8.

Therapy.—It may be used as an antispasmodic in doses of ♏xv–xxx, given in capsules, in alcoholic solution, or with mucilage. It has been used in insomnia, mania, delirium tremens, and in nocturnal epilepsy. Nache coincided with Wildermuth as to the efficacy of hydrate of amylene in frequent and severe attacks of epilepsy, especially where the bromides have failed. He thinks the *petit mal* and nocturnal epilepsy are much benefited by the drug. It has also been recommended for whooping-cough and to relieve the cough of phthisis.

AMYLUM (U. S. P.).—Starch.

Preparations.

Amylum Iodatum (U. S. P.).—Iodized Starch (5 per cent.). *Dose*, ʒj.
Glyceritum Amyli (U. S. P.).—Glycerite of Starch (10 per cent.). Local use.

Pharmacology and Therapy.—Starch is the fecula of the seed of Triticum vulgare (Graminaceæ). It is an important element of food, and forms a large part of rice, wheat, barley, arrowroot, and other commonly-used carbohydrates for administration to the sick. Starchy foods should not be given to young infants, who have not sufficient saliva or intestinal juices to digest them, for they may undergo putrefactive changes in the bowel and cause colic and diarrhœa. Starch is a fine, white powder, becoming adhesive when moist, and is a good application for burns or scalds, and for intertrigo, or chafing in infants. With boiling water, the starch-granules swell and burst and a homogeneous mass results, which answers very well as a poultice for alleviating local inflammation. The glycerite is a useful application in some skin affections, though the glycerin sometimes proves irritant, on account of its affinity for water. Starch is a convenient antidote to most corrosive poisons, when mixed with water; it is a test for free iodine, as it turns blue when brought in contact with this agent. Starch-water is a very good basis for laudanum injection or some other form of medicated enema, especially when it is combined as follows:—

℞ Aquæ amyli, ... f℥j.
Bismuthi subnit., ... ʒss.
Tinct. opii, ... ♏v vel x.
M. Sig.: Inject into the bowel when necessary. Use after a stool in diarrhœa.

℞ Aquæ amyli, ... f℥ss.
Chloral. hydratis, ... gr. iij vel v.
M. Sig.: Throw into the bowel every two or three hours in cholera infantum.

ANISUM (U. S. P.).—**Anise.**

Preparations.

Oleum Anisi (U. S. P.).—Oil of Anise. *Dose*, ♏v–x.
Aqua Anisi (U. S. P.).—Oil (2 parts per 1000).
Spiritus Anisi (U. S. P.).—Spirit of Anise (10 per cent.). *Dose*, f℥i–ij.
Anise also enters into paregoric elixir and liquor ammonii anisatus.

Pharmacology and Therapy.—The physiological effects of the fruit of Pimpinella anisatum (Umbelliferæ) are due to its volatile oil, which is also found in star anise (Illicium anisatum). It is carminative, and, having an agreeable odor and taste, is much used in treating flatulent colic in infants. Anise may be ordered thus for the latter disease :—

℞ Magnesii carb.,	℈ij.
Spt. chloroformi,	♏v.
Syrup. simplicis.,	fℨij.
Aquæ anisi,	ad f℥ij.

M. Sig.: A teaspoonful, for a child under one year, every hour.

In bronchial catarrh it is expectorant and slightly sedative, and is therefore used in cough mixtures.

ANTHEMIS (U. S. P.).—**Chamomile.**

Preparations.

Infusun Anthemidis (U. S. P.).—Infusion of Chamomile (℥iv–Oj). *Dose, ad lib.*
Oleum Anthemidis.—Oil of Chamomile. *Dose*, ♏ii–viij.

Pharmacology and Therapy.—The flower-heads of Anthemis nobilis (Compositæ) collected from cultivated plants. The oil, which is the active principle, has a powerful lowering action upon the reflex excitability of the spinal cord. The hot infusion acts as an emetic in large quantities, but in 1- or 2- ounce doses it is aromatic and carminative, and favors perspiration and the action of the kidneys. It checks reflex cough. A very good combination after a severe cold, in simple fever, and often in acute rheumatism, is prepared by pouring a pint of boiling water over an ounce each of chamomile-flowers and the leaves and flowering tops of boneset. The patient should drink about one-half, hot, on retiring, as a diaphoretic, or the entire pint, should emesis be desired. A very excellent prescription for flatulence, and especially flatulent colic in children, is :—

℞ Infus. anthemidis,	
Mist. sodæ menth.,	āā f℥iij.

M. Sig.: From one-half to two tablespoonfuls when necessary.

Locally, it may be used as a chamomile cataplasm, when heat and moisture, with some sedative action, are desired. It is used principally

in domestic practice in the treatment of colds, bronchitis, and intestinal disorders, or dyspepsia. The oil has been proposed as an antidote in strychnine poisoning, and is useful in spasmodic asthma. The oil of chamomile, on account of its sedative action, is a very good drug to add to fatty preparations for various inflammations of the skin. Used in the ointments named, it will prove of value :—

℞ Ol. anthemidis,	♏v vel x.
Bismuth subnit.,	ʒj.
Ungt. zinci ox. benz.,	℥j.

M. Sig.: Apply well over the surface for erysipelas, acute eczema, and erythema.

℞ Ol. anthemidis,	♏vj vel xij.
Hydrarg. chlor. mitis,	gr. x.
Ol. eucalypti,	♏v.
Lanolini,	℥j.

M. Sig.: Use upon old muslin, and apply to the surface in infantile eczema and in seborrhœa.

ANTHRAROBINUM.—Anthrarobin.

Pharmacology and Therapy.—A yellowish powder, not soluble in acids or water, but soluble in alkalies and alcohol. It is related to chrysarobin, for which it is a useful substitute as an application in skin diseases. It produces less irritation and staining than chrysarobin, and is said to have no toxic effects. Anthrarobin is excreted, for the most part, by the urine unchanged, though some of it is oxidized to form alizarin. It colors the skin yellow and the hair red. In psoriasis, tinea versicolor, and herpes it is used in 10-per-cent. ointment or alcoholic solution, which should be made fresh at least every week.

Anthrarobin can be prescribed thus at times with advantage :—

℞ Anthrarobini,	ʒj.
Ungt. zinci oxidi,	℥j.
Ungt. hydrarg. nitratis,	℥ss.—M.

For chronic eczema and psoriasis.

℞ Anthrarobini,	ʒj.
Ungt. hydrarg. oleatis (10 per cent.),	℥j.—M.

Use in tinea versicolor, as well as in ringworm and favus.

ANTIMONIUM.—Antimony.

Preparations.

Antimonii et Potassii Tartras (U. S. P.).—Tartar Emetic. *Dose*, gr. $\frac{1}{40}$–j.

Antimonii Oxidum (U. S. P.).—Oxide of Antimony (rarely used), gr. ii–iij.

Antimonii Sulphidum (U. S. P.).—For making the Oxide.

Antimonii Sulphidum Purificatum (U. S. P.).—Used in making Sulphurated Antimony.

Antimonium Sulphuratum (U. S. P.).—Sulphurated Antimony. *Dose*, gr. i–iij.

Pulvis Antimonialis (U. S. P.).—Antimonial or James's Powder (antimonii oxidum $\frac{1}{3}$, calcii phosphas $\frac{2}{3}$). *Dose*, gr. i–x.

Pilulæ Antimonii Compositæ (U. S. P.).—Plummer's Pills (containing sulphurated antimony and calomel, each, gr. ss; guaiaci, gr. j). *Dose*, 1–2 pills.

Vinum Antimonii (U. S. P.).—Antimonial Wine (contains about 2 grains tartar emetic in each ounce). *Dose*, ℳii–x.

Unguentum Antimonii.—Antimonial Ointment (tartar emetic 1, lard 4 parts).

Emplastrum Antimonii.—Antimonial Plaster (tartar emetic 1, Burgundy pitch 4 parts).

Tartar emetic also enters into syrupus scillæ compositus (U. S. P.), which is a syrup of squill and senega with tartar emetic (3 per cent., or about gr. $\frac{3}{4}$, to each ounce). Mistura glycyrrhizæ composita (U. S. P.), or brown mixture, contains antimonial wine, 6 parts in 100, or tartar emetic, about gr. $\frac{1}{8}$ per ounce.

Pharmacology.—Tartarized antimony, or tartar emetic, is a powerful irritant, and when applied to the skin causes redness, followed by an eruption resembling small-pox. When swallowed, it is a depressing emetic, increasing the secretions of the intestinal tract, with occasional diarrhœa. It has a powerful diaphoretic action, and is eliminated by the bile, milk, sweat, urine, and intestinal secretions. Upon the circulation it is depressing, the heart's action becoming weak and irregular and the arterial tension lowered. The pulsations are likewise retarded. Respiration becomes slower and the bronchial secretions are increased. The brain is not directly affected, except that under certain conditions, especially when combined with opium, tartar emetic exerts a sedative action. Large doses diminish reflex excitability of the spinal cord, and may produce paralysis. A special action has been noticed upon the liver, the waste of nitrogenous elements being increased, with diminished oxidation of the non-nitrogenous elements.

Toxicology.—When poisonous doses have been administered (gr. j or more), vomiting, with burning pain at the epigastrium, severe colic, purging, and small, frequent pulse and early collapse, with much prostration of muscular system, rapidly occur. Death may result from exhaustion or from resulting gastro-intestinal inflammation. The antidote is tannic acid, which renders the salt insoluble, to be followed by demulcents and anodynes to relieve the pain. Depression is counteracted by alcohol and digitalis.

Therapy.—Tartar-emetic ointment is a powerful counter-irritant, but is seldom used on account of the danger of producing sloughing and scars. The treatment of inflammations by tartar emetic in large doses has been abandoned, but fractional doses (gr. $\frac{1}{40}$) alone or in combination with Dover's powder (gr. ij) or nitre (gr. iij) have proved very serviceable in sthenic pneumonia and in pleurisy. In bronchial inflammation with deficient secretion the wine of antimony or compound syrup of squill are frequently given.

Tartar emetic should not be given in croup (especially diphtheritic), as it is too depressing. For bronchitis in children, Ringer advises a solution of 1 grain to 1 pint of water, of which a teaspoonful is to be given every quarter- or half- hour. Tarter emetic should seldom or never be administered to infants or very young children. It is useful in spasmodic asthma. A combination of tartar emetic and opium is very serviceable in the furious delirium which attends some cases of typhoid and typhus fevers. A similar condition in delirium tremens is relieved by the same treatment, which has also been used with success in puerperal mania. Ringer states that chorea is sometimes benefited by tartar emetic given in doses sufficient to produce vomiting once or twice a day.

In some skin diseases, as chronic eczema, psoriasis, and other scaly disorders, the use of tartar emetic or antimonial wine in small doses frequently repeated is often of much service.

The so-called tolerance of antimony was due to the fact that after the vitality of the system became lowered by its action, large doses could be swallowed without producing vomiting.

ANTIPYRIN.—Di-methyl-oxy-quinizine.

Dose, gr. v–xxx.

Pharmacology.—Antipyrin is a synthetical product belonging to the aniline series, discovered by Dr. Ludwig Knorr, who has obtained a patent for the process of preparation and retains the manufacture under his own control. It occurs in the form of a white, crystalline powder, of a slightly-bitter taste, freely soluble in water, alcohol, and chloroform, and less readily soluble in ether. Antipyrin melts at 113° C. (235.4° F.). A solution of antipyrin added to a solution of ferric chloride gives rise to a dark-brown color. With spirit of nitrous ether it shows a green color-reaction, and is changed into iso-nitroso-antipyrin.

Physiological Action.—Upon the unbroken integument it is devoid of effect, but upon denuded or ulcerated surfaces its solution is said to exert an analgesic influence. Moderate doses do not produce any marked results either in animals or healthy men. Excessive doses cause slight depression of the normal temperature, cyanosis, chilliness, cardiac debility, and diaphoresis. Given to animals, it occasions epileptiform and tetanic convulsions. Reflex movements are increased by small and decreased by large doses. Antipyrin depresses the function both of sensory and motor nerve-trunks. Moderate doses are productive of no decided effect upon the action of the heart. Lethal quantities cause, in frogs, arrest of the heart in diastole. Arterial tension is decreased by large doses, unless convulsions occur, in which case it is increased. Small doses augment blood-pressure. A solution of antipyrin applied to divided blood-vessels arrests hæmorrhage. Respiration is unaffected

by small doses; is first increased, but subsequently markedly decreased, by toxic doses. In fevered animals it causes a decided reduction of temperature, possibly by a direct action upon the heat-centres. Toxic quantities give rise to methæmoglobin in the blood. Antipyrin is possessed of some antiseptic power, and arrests fermentation. Absorption and elimination are rapid. Antipyrin is removed from the system by the kidneys, the urine being sometimes diminished and sometimes increased in quantity. Large doses cause a considerable decrease in the quantity of urine excreted.

Idiosyncrasy and Toxicology.—Many unpleasant and alarming, with sometimes fatal, effects have followed the administration of medicinal doses of antipyrin. Among these consequences are vomiting, profuse sweating, chills, cyanosis, collapse, salivation, dyspnœa, and epileptiform convulsions. Cutaneous eruptions are not infrequently caused by antipyrin. They assume in different cases the form of erythema, urticaria, or pemphigus. At times a rash similar to that of measles is produced. This is easily removed by administering belladonna with the antipyrin or by giving a hypodermic injection of atropine.

M. Verneuil has, in two instances, observed partial gangrene follow the hypodermic injection of antipyrin. When nutrition is lowered this agent should not be injected at the seat of disease.

A number of fatal cases have been reported from medium doses of antipyrin, especially in children, old persons, and those suffering from cardiac debility or disease. In such cases, therefore, the remedy must be used, if at all, with extreme caution. Poisoning is shown by restlessness, anxiety, slow respiration, weak pulse, and vertigo. Treatment is by diffusible stimulants, heart tonics (strophanthus or nux vomica), and artificial respiration or inhalation of oxygen. Heat favors while cold retards the action of antipyrin.

Incompatibles.—Antipyrin is incompatible with spirit of nitrous ether, calomel, the preparations of cinchona; hydrocyanic, nitric, and tannic acids; sulphate of copper, sulphate of iron, corrosive sublimate, salicylate of sodium, tincture of chloride of iron, syrup of the iodide of iron, tincture of iodine, tincture of catechu, kino, and rhubarb.

Therapy.—The therapeutic effects of this substance may be summed up as antipyretic, analgesic, and antispasmodic. When antipyrin is given in febrile states, the temperature begins to descend, at the end of half an hour to an hour, and reaches its lowest point of descent in three to five hours. The average time during which the temperature remains depressed is from six to nine hours. It is preferable to administer the drug in a few large doses rather than in small amounts repeated. It should always be borne in mind, however, that large quantities are apt

to produce collapse. The descent of temperature is usually, but not always, accompanied by profuse diaphoresis. In place of sweating, increased diuresis is sometimes observed.

Antipyrin is of especial value in hyperpyrexia. It may be used with advantage in previously vigorous subjects, in disease of a sthenic type, and when fever is, in itself, a source of danger. In typhoid fever it has often answered a very useful purpose in reducing extreme temperature. It may be used, also, in typhus fever, small-pox, and yellow fever. In scarlatina, accompanied by excessively high fever, we may have recourse to antipyrin. It has been found beneficial in erysipelas, reducing temperature and apparently limiting the spread of the disease. In croupous pneumonia it reduces the rate of respiration as well as the temperature, but has no influence upon the pulmonary inflammation. Antipyrin is efficacious in the pneumonia and bronchitis of children. According to the comparative studies of Professor Demme, of Berne, relative to the use of antipyretics in the treatment of the febrile diseases of children, antipyrin is of particular value in cases of broncho-pneumonia in which relapse and excessively high temperature are quite marked. He employs, in the first period of recurrence, antipyrin in aqueous solution, with a little sugar and a few drops of cognac. When given in this form it very seldom produces disturbance of the stomach, and very rarely fails to effect the desired reduction of temperature.* In the fever of pulmonary tuberculosis antipyrin is seldom likely to prove of advantage, on account of its depressant properties. In intermittent fever it is capable of reducing the fever, but not of preventing recurrence.

Antipyrin is of efficacy in acute and subacute articular rheumatism, and is not infrequently successful in those cases in which salicylate of sodium has failed. It not only reduces the fever, but also relieves the joint affections. Favorable reports have been made as regards its action in gout. The acute paroxysm is ameliorated and shortened, and the course of the chronic form modified.

Antipyrin is efficacious in relieving pain in the various forms of neuralgia, but has little effect upon that due to inflammatory diseases. It is of particular avail when the neuralgia depends upon a gouty or rheumatic taint. Hemicrania is often markedly relieved by the administration of this remedy. Excellent results have been obtained in sciatica from the use of antipyrin, especially when combined with quinine. It will often assuage the lancinating pains of locomotor ataxia. Pleuritic pains and the chest-pains of phthisis may be relieved by means of antipyrin. It has been used in dysmenorrhœa with asserted good success,

* See Medical Bulletin, March, 1891, p. 95.

and it has also been employed with a view to mitigating the pains of labor.

Potter mentions a case in which an acute paroxysm of gout was ameliorated and shortened by antipyrin. A dose of 25 grains was given at first, and was followed by 10-grain doses every second hour until decided relief was obtained. In chronic gout, also, it is reported to exert a beneficial influence.

Antipyrin mitigates the severity of a number of affections characterized by spasmodic action. In hysterical tremors and in chorea it is often of service. It has been seen to alleviate the paroxysms of whooping-cough, and in some instances it has seemed to shorten the course of the disease. In many cases of epilepsy antipyrin is efficacious in reducing the number of convulsions. It is said to be especially useful in epilepsy occurring at the menstrual epoch. Its value is enhanced by a combination with bromide of ammonium, as suggested by Dr. H. C. Wood, and it may be given, in the dose of 8 to 15 grains thrice daily, with 20 grains of the latter drug three times a day. The mixture has been continued for long periods without producing bromism. Dujardin-Beaumetz and others have observed benefit from the use of antipyrin, in daily doses of 30 to 45 grains, in diabetes mellitus. In diabetes insipidus, also, good results have been reported. Alexandre Paris treated a case of tetanus successfully by means of antipyrin. M. Clément considers it of value in promoting absorption of serous effusions in pleurisy, and it is said to allay the pain of glaucoma.

M. Guibert asserts that antipyrin arrests the secretion of milk, and may be safely administered for this purpose in doses of 4 grains every two hours.

Naphthol-Antipyrin.—M. G. Patein has succeeded in combining antipyrin with both alpha- and beta- naphthol, the former being a liquid and the latter a crystallized substance.

A valerianate of antipyrin and quinine has also been prepared.

Dr. J. Buisson has observed an admirable effect in nocturnal enuresis from the administration of three 10-grain doses of antipyrin at hourly intervals, beginning four hours before bed-time.

M. Vianna has ascertained that antipyrin is destructive to the bacillus of Löffler and its toxic products. He, therefore, suggests that the drug may prove useful in the treatment of diphtheria.*

Saint-Philippe regards antipyrin as of particular value in diarrhœa in children. Saint-Hilaire has taken advantage of the local anæsthetic properties of antipyrin in the treatment of affections of the nose, pharynx, and larynx.

* Le Progrès Médical, April 2, 1892.

ARGENTUM.—Silver.

Preparations.

Argenti Cyanidum (U. S. P.).—Cyanide of Silver. *Dose*, gr. $\frac{1}{40}$–$\frac{1}{20}$.

Argenti Nitras (U. S. P.).—Nitrate of Silver. *Dose*, gr. $\frac{1}{6}$–$\frac{1}{2}$.

Argenti Nitras Dilutus (U. S. P.).—Dilute Nitrate of Silver (nitrates of silver and potassium, equal parts). Cast into molds. External use.

Argenti Nitras Fusus (U. S. P.).—Lunar Caustic for external use.

Argenti Oxidum (U. S. P.).—Oxide of Silver. *Dose*, gr. ss–ij.

Argenti Iodidum (U. S. P.).—Iodide of Silver. *Dose*, gr. $\frac{1}{8}$–$\frac{1}{4}$.

Argenti Oleatum.—For external use.

Pharmacology.—Metallic silver is a white metal taking a high polish, and not usually affected by acids or by oxygen, although readily tarnished by sulphur. It is officinal only in the form of salts, of which the nitrate is most largely used. The nitrate of silver is an anhydrous salt which crystallizes in colorless rhombic plates. It is readily soluble in cold water, and has a metallic, styptic taste. Upon the addition of hydrochloric acid or a soluble chloride to a solution of the nitrate, a white, curdy precipitate is formed. This precipitate is wholly soluble in ammonia. The crystals, fused and cast into molds, present the form of round, grayish sticks. The cyanide is convenient for the extemporaneous preparation of hydrocyanic acid by adding an excess of some mineral acid to the solution containing this salt. Silver wire is used in surgery for sutures and for canulæ for tracheotomy, catheters, etc.

Physiological Action.—The nitrate of silver, in weak solutions, acts as an astringent, and, in substance, coagulates the albumin of the tissues and destroys their vitality, acting as a caustic. The mitigated stick of lunar caustic is mild and superficial in its action; the pure nitrate may cause sloughing or ulceration. One objection to its use is the discoloration it leaves behind, the skin becoming black after exposure to the light. Local applications of nitrate of silver whiten mucous membrane. When swallowed, symptoms of irritant poisoning appear, with pain, distress, and vomiting. Common salt is the antidote, and vomiting should be encouraged by administering hot salt water; after cleansing the stomach the bowels should be emptied by oil. When any of the silver salts (but especially the nitrate) have been taken for a length of time, a slate-colored line appears along the gums and upon the ocular conjunctiva, and soon afterward the general surface of the body becomes dingy or slate-colored, due to the deposit of metallic silver in the pigment-layer of the skin and in all the constituents of the skin below the Malpighian layer. This condition is known as **Argyria,** and is permanent. The patient should be carefully observed during the administration of silver, and the remedy from time to time intermitted. It is expedient, also, to guard against accumulation by an occasional purge. The uninterrupted use of silver for

a longer period than six weeks is unwise. In medicinal doses the silver salts act as a tonic to the nervous system, and changes occur in the blood; tissue change is increased; the flow of bile is also increased, and in larger doses there is embarrassment of the respiration, depression of the circulation, and reduction of temperature. Tetanic convulsions or paralysis may be produced by overdoses, the paralysis being of central origin.

Therapy.—Nitrate of silver is used locally in 1-per-cent. solution dropped into the eyes of newborn infants to prevent purulent conjunctivitis (ophthalmia neonatorum) after the method of Credé; but it has fallen into disuse in treating conjunctivitis in the adult, owing to the discoloration which follows its use. The mitigated stick is a good application to granular lids, chancroids, small-pox vesicles (in order to prevent pitting), and in general to excite a healthy action of granulating surfaces. In gynæcology, the lunar caustic, in solid form, is used in chronic cervical catarrh and in venereal sores. An application of the solid stick to the scrotum has a good effect in acute epididymitis or orchitis; also in lymphangitis of the forearm, from a poisoned wound of the finger. Thoroughly applied to the wound, it is claimed to be a complete protection against hydrophobia. For nasal catarrh it may be mixed with some gum acacia, pulverized, and blown into the throat or nose. In pharyngitis, tonsillitis, and laryngitis, solutions (made with water or spirit of nitrous ether of gr. xx–xl per ounce) are applied with excellent results; Dr. Horace Green advocated the stronger solution applied with a probang to the larynx in diphtheritic croup. In appropriate cases, these solutions are valuable in gonorrhœa, urethritis, etc. In erysipelas, the disease may sometimes be arrested by outlining it with nitrate of silver. It has also been used with good results in pruritus vulvæ, herpes, eczema, and lichen when they occur in circumscribed patches. Boils may sometimes be aborted in this way, and a stye on the eye may be checked by an early application.

On account of the staining of the skin, nitrate of silver is but little used internally, although it has acknowledged effects upon the nervous system. The oxide of silver is claimed to be free from this objection and equally efficient, especially in the early stages of locomotor ataxia and in epilepsy. In gastralgia, also, the silver salts are sometimes remarkably curative. When, in typhoid fever, symptoms of irritation in the alimentary tract become prominent, and peritonitis or hæmorrhage appears imminent, the following prescription is used by Pepper, in the Philadelphia Hospital:—

℞ Argenti nitratis, ... gr. ij.
Mucilag. acaciæ, ... f℥ij.

M. Sig.: A teaspoonful three or four times daily, combined with tincture of opium or belladonna, if necessary, for diarrhœa or constipation.

The nitrate or oxide of silver may also be given as follows :—

℞ Argenti nitratis,
Extracti opii, ... āā gr. ij.
M. et ft. pil. no. viij.
Sig.: A pill every four hours, for gastric ulcer.

℞ Argenti oxidi, ... gr. ij.
Ext. belladonnæ alc., ... gr. j.
Ext. gentianæ, ... ℈j.
M. et ft. pil. no. xvj.
Sig.: A pill three times a day.

An efficient prescription for neuralgia and chorea :—

℞ Argenti nitratis, ... gr. iij.
Syrup. ipecac., ... f℥j.
Morphinæ sulphatis, ... gr. j.
Mucil. acaciæ, ... f℥ij.
M. Sig.: A teaspoonful in water three times a day, before meals. Exerts marked influence over chronic diarrhœa, especially of phthisis.

The solid stick is useful in restraining the bleeding from leech-bites. When, in the course of a chronic illness, bed-sores threaten to form, the local application of a solution containing 20 grains of nitrate of silver to the ounce will avert the mischief. Ringer has found the same salt useful in whooping-cough. A solution may be applied to the throat by a mop or sponge, or it may be used in the form of a spray. The latter method, however, is inapplicable to children less than 3 years of age. The stain produced, moreover, is a serious objection to the spray. A strong solution, or the solid stick, is a good stimulant to indolent ulcers and to ulcer of the rectum. A 40-grain solution in nitrous ether has been used in tinea trichophytosis. A solution containing from 20 grains to 2 drachms to the ounce of water may be successfully employed by injection of small quantities (5 to 10 drops) into the sac of a hydrocele or cystic tumor. A sponge probang saturated with a very weak solution of nitrate of silver is sometimes of service in spasmodic stricture of the œsophagus. Applications should be made occasionally, at intervals of several days. In pseudo-membranous enteritis it is a good practice, in the intervals of paroxysms, to irrigate the bowel with a 5- to 10- grain solution of nitrate of silver. Prolapsed rectum, especially in children, is benefited by cauterization with the nitrate of silver.

In gastric catarrh, the gastro-intestinal catarrh of phthisis, ulcer of the stomach, or chronic diarrhœa, we may combine it as follows :—

℞ Codeinæ, ... gr. iij.
Argenti nitrat., ... gr. vj.
Pulv. acaciæ, ... q. s.
Div. in pil. no. xij.
Sig.: Give one every two to four hours.

In pill form the effect is more sustained, and the remedy can be given in larger doses than when in solution. When used in affections of the stomach, the remedy is best given a half an hour or so before meals, in order that the local effect may be secured.

Dysentery, with ulceration of the large bowel, is very much benefited by large injections of weak solutions of nitrate of silver (gr. $\frac{1}{8}$–$\frac{1}{4}$ to the ounce of mucilage). Bartholow advises the internal use of the nitrate combined with opium in addition to the treatment by injections. According to the same writer, either the nitrate or the oxide is useful in nervous dyspepsia, cholera infantum, and jaundice depending upon catarrh of the bile-ducts. Silver is sometimes beneficial in chorea. The oxide of silver is occasionally able to check profuse perspiration, and may prove useful in menorrhagia. The nitrate has given relief in obstinate enteralgia.

ARISTOL.—Dithymol Di-iodide.

Pharmacology.—Aristol is made by adding a solution of iodine in iodide of potassium to an aqueous solution of hydrate of sodium containing thymol, when it is thrown down as an abundant, red-brown, amorphous precipitate. In the reaction an iodine atom is substituted in hydroxyl. The proportion of iodine present in aristol has been estimated by Carius at 45.80 per cent.

Aristol is insoluble in water and glycerin, slightly soluble in alcohol, but readily so in ether. The addition of alcohol precipitates it from its ethereal solution. It is very soluble in oils, but the solution must be made by friction without the aid of heat, since aristol is decomposed by the action of heat or of light. The character of its chemical combination renders it an unstable compound. It possesses but a slight odor, which agreeably recalls that of thymol. In this respect it is decidedly preferable to iodoform.

Physiological Action.—Aristol adheres very readily to the skin, and is, therefore, well adapted for use as a dusting-powder. It is free from irritant action upon the unbroken skin. Applied to the mucous membrane, it promotes secretion. It is not absorbed either through mucous membranes or raw surfaces, and therefore produces no toxic effect. It has been given internally by Neisser with no appreciable result. This experimenter found that, when dissolved in suitable menstrua and injected into the blood, it became decomposed and iodine appeared in the urine.

The absence of disagreeable odor and its freedom from toxic influence are features which give aristol a great advantage over iodoform, and, from the evidence now before us and continually accumulating, it seems probable that in a wide range of conditions it may eventually supplant the latter substance.

Therapy.—The attention of the profession was first drawn to aristol by Dr. Eichhoff, of Elberfeld, who warmly commended its local action in a number of affections. His experiments have been confirmed by various observers, both in Europe and America.

Aristol is remarkably efficacious in promoting rapid cicatrization. Varicose ulcers of the leg, so common in the old or decrepit, heal very quickly under the application of an ointment containing 10 per cent. of aristol. A 5-per-cent. ointment proved equally efficacious in the case of open buboes. In lupous ulcers a smooth, sound, and healthy scar is at times obtained by the use of aristol, either as a powder or in the form of an ointment. Eichhoff points out the fact, which was confirmed by the investigations of Neisser, that the remedy is ineffective in lupus which has not advanced to the ulcerative stage. The explanation is that aristol has no corrosive power. It is not capable of destroying or penetrating an intact cuticle, and therefore can exert no influence upon the cells of the lupous nodule. Its action is not upon lupus *as such*, but upon the ulcer which is the consequence of an advanced stage of the disease. Eichhoff in several cases anticipated the result by the formation of an artificial ulcer by the use of the sharp spoon or Pacquelin's cautery. He found, moreover, that aristol failed in ulcerated lupus of the nose, and suggests that in this situation the bacilli are imbedded in and protected by the cartilage, and are not in a position to be attacked by aristol. In lupus erythematosus, likewise, the affected skin must be acted upon by some escharotic as a preliminary, after which aristol may promote a speedy cure. In scrofuloderma, excellent results have been obtained by the use of the remedy under discussion. Overhanging edges should be trimmed away, and if the granulations are flabby the base of the ulcer should be scraped before the aristol is applied. Upon the ulcers of late secondary or tertiary syphilis this remedy exhibits a remarkable influence. Eichhoff, indeed, expressly asserts that as a local application in tertiary syphilis it is superior to any other agent. It is of equal value in the ulcers of the congenital form of the disease, and in the large, moist papules of hereditary or acquired syphilis. Another manifestation of this malady, which may be amenable to the influence of aristol, is ozæna. Within a few days the fœtor and discharge may disappear and scabs cease to form. Simple ozæna also is notably improved by the same treatment. In dry rhino-pharyngitis, atrophic rhinitis, and dry laryngitis the insufflation of aristol is of decided benefit. Brocq and others have witnessed cicatrization of ulcerated epithelioma due to the action of aristol. Gaudin describes a case of epithelioma of the uterus and vagina in which the odor was extremely offensive. A cotton tampon coated with aristol-powder soon removed the odor and caused the

discharge of pieces of the growth. Professor William F. Waugh relates* a case of ulcerated scirrhus of the breast in which a surprising improvement was effected within a few days by aristol thickly dusted over the surface. In a week, granulations of healthy appearance developed upon the surface of the sore.

The writer is by no means desirous of advocating injudiciously and prematurely the virtues of a new medicament, especially in reference to such a malign affection as cancer. But, from the testimony of excellent observers and from his own clinical experience, aristol appears to have a power not hitherto exhibited by any remedy, that of originating apparently healthy granulations and cicatrization of a cancerous ulcer. Eichhoff obtained a prompt cure of chancres of the penis and lips, but, strangely enough, saw no good effects from the use of aristol in chancroid. His experience as regards chancroid has been corroborated by Neisser. Professor Keyser reports that this drug is very good in ulcers of the cornea, in an ointment of 1 to 2 grains to the drachm of lanolin and benzoate of lard mixture. He has derived great benefit from it in pure powder on ulcers of the lid and brow; it causes such to heal up very quickly. It acts, he adds, like iodoform, and has not such a very penetrating and unpleasant odor.

This substance is likewise an excellent and prompt antiseptic. In tinea tonsurans and tinea sycosis it generally proves efficient in the form of an ointment containing from 5 to 10 per cent. In favus, however, it is of little or no avail. In gonorrhœal urethritis in women, aristol made into cylinders with oil of theobroma was curative in six out of nine cases treated by Eichhoff. In acute gonorrhœa of the male, a 5-per-cent. solution of aristol in oil seemed to be productive of no good results. Nevertheless, when abandoned and another remedy substituted, the patients made a more rapid recovery than those in whom no aristol had been used. In a case of gleet of twenty years' standing, Professor Waugh saw a very rapid disappearance of the discharge after the introduction of a very small quantity of aristol mixed with liquid and solid vaseline to the consistency of thick cream. The same observer reports a case of endometritis with dysmenorrhœa rapidly relieved by a tampon dipped in glycerin and rolled in aristol-powder, intra-uterine applications of the same remedy being repeated twice a week. Gaudin mentions a case of endometritis following abortion, in which treatment by aristol was soon followed by improvement. Similar cases have been cited by Swiecicki, who was the first to publish the results of aristol treatment in gynæcology. Eichhoff, Lassar, Gaudin, Neisser, and others have witnessed decided improvement from the use of this agent in psoriasis. I have

* Times and Register, September 20, 1890, p. 258.

found it at least as beneficial as chrysarobin, while, unlike the latter, it does not stain the skin and clothing, and is free from the danger of exciting conjunctivitis. In eczema squamosum, likewise, notable amendment has attended its use. Rohrer has employed aristol by insufflation with very satisfactory results in subacute and acute inflammation of the middle ear. The discharge speedily diminished, the mucous membrane became smooth, and the perforations healed. Inflammation of the external ear was also very amenable to its influence. Guerra y Estape obtained excellent results in twenty cases of disease among children, to whom iodoform is so repugnant, and, in fact, dangerous. An extensive ulcer over the parotid gland healed in seven days, a chronic coryza in six days, and in the case of an unhealthy ulcer over the thorax suppuration ceased in twenty-four hours and cicatrization soon began. No ill effects were seen in any of the cases. Pollack, of Prague, has found aristol to possess marked sorbifacient virtues. An enlarged thyroid gland was perceptibly decreased in less than two weeks and soon afterward the neck was quite normal in size. In epididymitis, chronic tubercular adenitis of the neck, parametritis, and typhlitis, equal success attended the use of the remedy.

At the Hôpital Saint-Louis, in Paris, an aristol plaster has been used. The following is the method of its preparation: Finely-powdered aristol is mixed with a small quantity of oil, and to the mass is added lanolin and caoutchouc plaster, previously cooled and made very fluid by the addition of benzine. The benzine is sufficiently evaporated to leave a preparation suitable for spreading upon muslin.

The following formulæ containing aristol will be found of great service:—

℞ Aristol, ... ℥ss.
Pulv. zinci carb. impur., ... ℥ss.

M. Sig.: Dust over the surface. Employ as a dressing to wounds; also, in excessive sweating and oily state of the skin.

℞ Aristol, ... ʒss.
Ungt. zinci oxidi, ... ℥ss.
Ungt. plumbi subacetatis, ... ℥ss.

M. Sig.: Apply well to the surface. Beneficial in infantile and chronic eczema and in psoriasis.

℞ Aristol, ... ʒj.
Camphoræ,
Lupulinæ, ... āā gr. xxxvj.
Ol. theobromæ, ... q. s.

M. et ft. suppos. no. xij.

Sig.: Insert one in the vagina for leucorrhœa and pruritus. Employ also in pruritus of the bowel.

℞ Aristol, ... ʒss.
Ungt. aquæ rosæ, ... ℥ss.
Ungt. zinci oxidi, ... ℥ss.
M. Sig.: Use night and morning to the parts. Valuable for acne and rosacea.

℞ Aristol, ... ʒss.
Camphoræ, ... gr. x.
Lanolini, ... ℥ss.
Ungt. zinci oxidi, ... ℥ss.
M. Sig.: For application to fissures of the nipples, hands, feet, and genital organs.

℞ Aristol, ... gr. l.
Ext. belladonnæ alc., ... gr. iiss.
Ol. theobromæ, ... q. s.
M. et ft. suppos. no. x.
Sig.: Insert one in the bowel when necessary, to relieve pain. For cystitis and prostatitis.

ARNICA (U. S. P.).—Leopard's Bane.

Preparations.

Tinctura Arnicæ Florum (U. S. P.).—Tincture of Arnica-Flowers (20 per cent.). *Dose*, ♏x–xxx.

Tinctura Arnicæ Radicis (U. S. P.).—Tincture of Arnica-Root (10 per cent.). *Dose*, ♏v–x.

Extractum Arnicæ Radicis (U. S. P.).—Extract of Arnica-Root. *Dose*, gr. i–ij.

Extractum Arnicæ Radicis Fluidum (U. S. P.).—Fluid Extract of Arnica-Root. *Dose*, ♏v–xx.

Emplastrum Arnicæ (U. S. P.).—Extract, 1 part; resin plaster, 2 parts.

Infusum Arnicæ Florum (1 in 5 of water). For local use.

Pharmacology.—Arnicæ Flores, the flower-heads, and Arnicæ Radix, the rhizome and rootlets, are both officinal; they belong to the natural order Compositæ, indigenous to Northern Europe and Siberia, also in the northwestern part of the United States. The flowers are orange-yellow, disk shaped with rays, of feebly aromatic odor and bitter, unpleasant taste. Trimethylamine has been obtained from the flowers, but the principal constituent to which its local effects are due is probably a volatile oil; besides this there is a glucoside, **Arnicin,** and also inulin, tannic acid, resin, and other unimportant elements.

Physiological Action.—Applied to a delicate skin, arnica produces redness and inflammation resembling erysipelas. It acts as a counter-irritant and revulsive. Internally, in small doses, it has some stimulating influence, raising the blood-pressure and the action of the heart, producing a feeling of warmth over the body and increasing the secretions. Larger doses cause depression, paralysis of the vagi, followed by vomiting and collapse. Death results from the cessation of the heart's action, and in part from the accumulation of carbonic acid in the blood. Atropine is the physiological antidote, with stimulants, artificial respiration, and counter-irritation.

Therapy.—Arnica is largely used in domestic practice, and by irregular practitioners as a remedy for sprains, contusions, myalgia or rheumatism and local paralysis, and it is also believed to have some influence over hæmorrhages. The plaster is useful for external disorders. It is asserted by some authorities that any power it may have in causing absorption of ecchymosis is really due to the alcohol of the tincture which is commonly used. The author, from clinical experience, believes that arnica has most effective local result upon the tissues, particularly in rheumatism, boils, abscesses, and in all thickened conditions of the integument. The following combinations are especially of value:—

℞ Ext. arnicæ radicis fl.,
Lin. saponis,
Tinct. opii, ... āā f℥j.
M. Sig.: Apply with friction for boils, abscesses, and thickening of the skin.

℞ Ext. arnicæ radicis fl.,
Aquæ hamamelidis dest., ... āā ℥iij.
M. Sig.: Use on muslin or lint for hæmorrhages. A rheumatic joint may be covered with cloths saturated with the arnica and witch-hazel, the combination often being more effective when applied hot.

Arnica has been used internally in large doses in mania with high arterial excitement, in delirium ebriosum, and in acute rheumatism in sthenic subjects. Small doses of the tincture are useful in fever attended with much depression.

ASAFŒTIDA (U. S. P.).—Asafetida.

Dose, gr. x.

Preparations.

Mistura Asafœtidæ (U. S. P.).—Mixture of Asafetida (4 per cent.). *Dose*, f℥ss–j.

Mistura Magnesiæ et Asafœtidæ (U. S. P.).—Mixture of Magnesia and Asafetida. Dewees's Carminative (tr. opii deod., 1 per cent.). *Dose*, fʒss–j.

Tinctura Asafœtidæ (U. S. P.).—Tincture of Asafetida (20 per cent.). *Dose*, fʒss–j.

Pilulæ Asafœtidæ (U. S. P.).—Pills of Asafetida (each containing gr. iij asafetida). *Dose*, 1–4 pills.

Pilulæ Aloës et Asafœtidæ (U. S. P.).—Pills of Aloes and Asafetida (of each, gr. 1⅓). *Dose*, 1–4 pills.

Pilulæ Galbani Compositæ (U. S. P.).—Compound Pills of Galbanum (asafetida, gr. ss). *Dose*, 1–4 pills.

Emplastrum Asafœtidæ (U. S. P.).—Asafetida Plaster (35 per cent.).

Pharmacology.—Asafetida is a gum-resin obtained from the root of Ferula narthex and Ferula scorodosma (Umbelliferæ), usually obtained by incision from the living root. This plant is a native of Persia and neighboring countries. The United States Dispensatory says that the source of the asafetida of commerce must still be considered doubtful; it usually is brought to this country from India. The drug occurs as rough, irregular, rather soft masses, of brown color, somewhat garlicky odor, and acrid to the taste. The odor depends upon a volatile oil, which

appears to be a persulphide of allyl. The agent also contains ferulaic acid, resin-gum bassorin, with traces of acid malate of calcium (Pelletier).

Physiological Action.—The effects are moderately stimulating, antispasmodic, and expectorant. Large doses cause vomiting and diarrhœa, especially in persons unaccustomed to its effects. In medicinal doses it is carminative, and increases the quantity of the gastric juice. The sexual functions are said to be stimulated, and a general feeling of warmth is diffused through the body. Asafetida increases the action of the heart and arterial pressure, stimulates the functions of the skin and kidneys, and is a mild cerebral excitant. It is eliminated by the lungs, bowels, skin, and kidneys.

Therapy.—Asafetida is not used locally (although the plaster is officinal), since, to those unaccustomed to its use, the odor is very offensive. This, however, makes it additionally useful in treating some nervous disorders, such as hysteria. Goodell advises that a teaspoonful of the tincture be mixed with hot water under a hysterical patient's nose, and used either by the stomach or per enema. In nervousness of children, the pills are serviceable, and in colic or convulsions the mixture or milk of asafetida may be used freely as an injection. The mixture of magnesia and asafetida is used as an antacid and carminative for infants with colic, but the opium in it must not be overlooked. The pil. galbani comp. are used for flatulence and intestinal indigestion in elderly people. The combination with aloes is theoretically useful in amenorrhœa, but, practically, it is just in these cases that asafetida cannot be used, on account of its odor and taste. Small doses of asafetida are valuable in the later stages of bronchitis, especially that of old people. Its combination of expectorant and carminative virtues likewise renders it of service in emphysema. It may often be advantageously employed in spasmodic asthma, especially used as follows:—

℞ Mist. asafœtidæ, ... f℥j.
Elix. ammon. valeriatis,
Elix. humuli, ... āā f℥iss.
M. Sig.: A teaspoonful or two in water every hour or two.

In the flatulence and constipation of hypochondriasis it is a good remedy, and is especially appropriate on account of its undoubted exhilarant effect upon the brain. The mixture of asafetida injected into the rectum is efficient in promoting the expulsion of flatus, and may be resorted to in the tympanites of typhoid fever. It can be prescribed thus:

℞ Tinct. asafœtidæ, ... f℥j.
Tinct. cardamom. co., ... f℥j.
Spt. ammon. arom., ... fʒj.
Aquæ menth. pip., ... f℥ij.
M. Sig.: One to two teaspoonfuls in water every two or three hours.

ASCLEPIAS (U. S. P.).—**Pleurisy-Root.**

Preparations.

Infusum Asclepias.—Dose, f℥i–ij.
Tinctura Asclepias.—Dose, f℥ss–j.
Asclepidin.—Dose, gr. i–v.

Pharmacology.—The root of Asclepias tuberosum (Asclepiadaceæ) contains resins and fatty matter. **Asclepidin** appears to be impure resin, precipitated from alcohol.

Physiological Action.—The infusion is used in the South as a diaphoretic and expectorant; in large quantities it is emetic and cathartic. It depresses the heart's action and increases that of the skin and kidneys.

Therapy.—The recent infusion (1 ounce to the pint; dose, a wineglassful) is used in domestic practice for colds and pulmonary affections of an inflammatory and catarrhal character. In diarrhœa, dysentery, and painful disorders of the stomach or bowels, it is often effective, a very good prescription being:—

℞ Tinct. asclepias,	f℥ij.
Spt. vini gallici,	f℥j.
Syrup. rubiidæi,	f℥iij.

M. Sig.: A tea- to a table- spoonful every hour or two, for diarrhœa and dysentery.

As a diaphoretic, it is used in the exanthemata, in order to facilitate the eruption and reduce the fever, and it is said to be advantageous in articular rheumatism, in controlling the inflammation and reducing the heart's action.

ASEPTOL.—Sozolic Acid.

Pharmacology and Therapy.—A syrupy, dark liquid, freely soluble in alcohol, water, and glycerin. It contains orthophenol-sulphonic acid (33⅓ per cent.) diluted with water, and resembles carbolic acid in odor, though fainter. It is less caustic, but is decidedly antiseptic, and is said not to be toxic. When used, it is to be diluted (1 to 20 of water) for surgical practice.

ASPARAGUS.—Asparagus.

Preparation.

Asparagin.—Dose, gr. i–ij.

Pharmacology and Physiological Action.—The root of Asparagus officinalis (Liliaceæ), when fresh, is used in decoction or infusion (℥i–ij to Oj) as a diuretic, laxative, and blood-purifier. The fresh shoots are used as food, and increase the flow of urine, while imparting to it a peculiar, heavy odor; in some cases it has apparently caused congestion of the kidneys, with hæmaturia. **Asparagin,** which is obtained princi-

pally from the root, has a sedative action upon the circulation, reducing the force and frequency of the heart's action, and causing frontal headache.

Therapy.—Asparagus was believed by the ancients to have valuable aphrodisiac properties, and was used as an emmenagogue; the writer confirms the observation of Ehrhardt, that a discharge resembling gonorrhœa or urethritis is caused by eating asparagus. It has been recently claimed that it has special effects upon the uterus as an oxytocic after miscarriage, or in labor. A tincture (℥v of the dried tops to Oij proof-spirits) is used as a diuretic, in doses of ʒss–j, by Dr. Jefferson, of England. A better preparation would result from crushing and straining five pounds of the fresh tops and evaporating the juice to one pint, to which an equal quantity of rectified spirits should be added, the dose being the same. Asparagin in doses of two or three grains may be used as a diuretic in dropsy, and, according to Whitla, appears to act in gout like weak doses of colchicum. It is also of some service in cardiac dropsy, chronic rheumatism, and gout. The combination of asparagin with one of the bromides for the latter affections in this prescription is often of value:—

℞ Asparagin, ...	gr. xvj.
Sodii bromidi, ...	ʒv.
Syrup. aurantii, ...	f℥iv.

M. Sig.: Two teaspoonfuls in water three or four times a day.

ASPIDIUM (U. S. P.).—Aspidium (Male Fern).

Dose (in powder), ʒss–ʒiss.

Preparation.

Oleoresina Aspidii (U. S. P.).—Oleoresin of Aspidium. *Dose*, fʒss–ij.

Pharmacology.—Aspidium is the rhizome of the Filix mas, or male fern, and of the Aspidium marginale (Filices), plants found in almost every portion of the world, especially the former, the latter being indigenous to North America. The rhizome, the portion employed, which deteriorates by being retained for a long time, has a sweetish-bitter, astringent taste, with some slight odor. It contains an active principle, filicic acid, a fixed and volatile oil, resin, tannic and gallic acids. Its virtues are due to the ethereal extract, or oleoresin.

Physiological Action and Therapy.—Male fern possesses the power of expelling and perhaps destroying tænia. Harley believes that it is only able to detach the entozoon from the intestinal wall. It is especially active against the bothriocephalus latus.

Large doses of the ethereal extract, or oleoresin, may occasion nausea, vomiting, and choleraic diarrhœa, followed by death from the

congestion and inflammation of the gastro-intestinal tract by the irritant action of the drug. The *American Journal of Pharmacy* recently states that the *Wiener klinische Wochenschrift* reported the case of a child 5½ years old, to whom 2 drachms of the oleoresin were given in three doses within one hundred minutes. In an hour and a half part of the tapeworm was expelled, then vomiting occurred, and somnolence, followed by twitching, sopor, and trismus of ten minutes' duration, ending in death five hours after the last dose of the extract.

A post-mortem examination of a case of poisoning and death from male fern revealed congestion and ecchymoses of the stomach and blood-clots over its surface. Poisoning from male fern should be treated by the administration of castor-oil and the hypodermatic injection of spirit of ammonia in from 10 to 30 minims, properly diluted.

Therapy.—Male fern is an efficient tæniacide. The ethereal extract, or oleoresin, is the most acceptable preparation, but, being a thick, bitter, nauseous substance, it is best given in capsules. It can be given, but not so well, in milk or mucilage. The dose (ʒss to ʒij) should be preceded and followed by a purgative. Trousseau and Pidoux advise the restriction of food to a milk diet for a day or two previous to the treatment being undertaken. Whitla has found that male fern is efficient among children in a reduced dose when combined with turpentine.

This combination of male fern often acts well, especially if a restricted diet precede the use of the preparation, and if it be followed by a good purgative, castor-oil being one of the very best to employ :—

℞ Oleoresinæ aspidii,	ʒss.
Ol. peponis expressi,	f℥ss.
Ol. terebinthinæ,	♏xxx.

M. Sig.: Take at a dose after fasting, and follow by a purgative.

ATROPINA.—Atropine.

ATROPINÆ SULPHAS.—Sulphate of Atropine. See Belladonna.

AURANTIUM —Orange.

Preparations.

Aurantii Dulcis Cortex (U. S. P.).—Sweet Orange-Peel. The rind of the fruit of Citrus aurantium (Aurantiaceæ).

Aurantii Amari Cortex (U. S. P.).—Bitter Orange-Peel. The rind of the fruit of Citrus vulgaris.

Aurantii Flores (U. S. P.).—Orange-Flowers. The partly expanded fresh flowers of Citrus aurantium and Citrus vulgaris (Aurantiaceæ).

Oleum Aurantii Florες (U. S. P.).—Oil of Orange-Flowers (Oil of Neroli).

Oleum Aurantii Corticis (U. S. P.).—Oil of Orange-Peel.

Extractum Aurantii Amari Fluidum (U. S. P.).—Fluid Extract of Bitter Orange.

Tinctura Aurantii Amari (U. S. P.).—Tincture of Bitter Orange (20 per cent.).

Aqua Aurantii Florum (U. S. P.).—Orange-Flower Water.
Syrupus Aurantii Florum (U. S. P.).—Orange-Flower Syrup.
Elixir Aurantii (U. S. P.).—Elixir of Orange. Simple elixir.
Syrupus Aurantii (U. S. P.).—Syrup of Orange.
Tinctura Aurantii Dulcis (U. S. P.).—Tincture of Sweet Orange (20 per cent.).
Spiritus Aurantii (U. S. P.).—Spirit of Orange (oil of orange-peel, 6 parts; alcohol, 94 parts).

The dried peel of bitter orange enters into compound tinctures of cinchona and gentian.

Pharmacology and Therapy.—Orange-juice, with water and sugar, may be used as a drink for fevers, and as an antiscorbutic. Care should be taken, after typhoid fever, not to allow children to suck the juice from the orange, as death has been caused by the passage of a seed through an ulcerated patch in the intestine. Death has also been caused by a child eating the fresh rind, which contains the volatile oil. The elixir is an agreeable vehicle for other remedies, having the alcoholic strength of a cordial. The other preparations are pleasant flavoring agents.

AURI ET SODII CHLORIDUM (U. S. P.).—**Chloride of Gold and Sodium.**

Dose, gr. $\frac{1}{50}$–$\frac{1}{10}$.

Pharmacology.—On account of its position among metals, gold has been believed to have some special medicinal value, although not a normal constituent of the human body. It is practically non-corrosive, and, before the era of antiseptic surgery, it was used to some extent to protect instruments from rusting. In a pure state gold is too soft for most purposes, although it is the best material for wire and for filling teeth. The only preparation officinal is the chloride, which is combined with an equal quantity of chloride of sodium, corresponding with 32.4 of metallic gold. This forms an orange-colored powder, slightly deliquescent in the presence of dampness, freely soluble in water. It is best dispensed as a tablet triturate.

Physiological Action.—The effects of the chloride of gold are very much like those of the mercuric chloride. In concentrated form it has an escharotic action upon the skin. Internally, in very small doses, it acts upon the glandular structures of the stomach and liver; it stimulates nutrition and assimilation; but, in larger doses, it reduces the oxidizing power of the red blood-cells. This salt exercises a constipating effect upon the bowels. Upon the brain and spinal cord its effects are those of a tonic. Large doses may cause gastro-enteritis, vomiting, etc., similar to corrosive chloride of mercury, and the antidote is albumin and demulcents. The remedy acts upon the kidneys, increasing the urinary flow, and the secretion, after large doses, is colored yellow. It is claimed that gold has aphrodisiac powers, causing painful erections in

men and increasing the menstrual flow in women. It is possible that the well-known reference to gold as a stimulant to venery, contained in Burton's "Anatomy of Melancholy," is a play upon words, and is poetical rather than medical in its application. Gold is removed from the body chiefly by the kidneys, but to some extent also by the liver and bowels

Therapy.—From the physiological action upon the glandular system of the stomach and liver, and the resulting improvement in the powers of assimilation, gold may be especially valuable in atonic dyspepsia, enabling the patient to digest more food. It is of decided service in nervous dyspepsia. Also, in gastric catarrh, chronic inadequacy of the hepatic functions (torpid liver), and early stage of cirrhosis, the gold and sodium chloride is a useful remedy. Administered in this prescription, it often is most effective in gastric catarrh and torpid liver:—

℞ Auri et sodii chloridi, ... gr. ss.
Ext. nucis vomicæ, ... gr. iij.
Ext. taraxaci, ... ℨj.
M. Ft. pil. no. xxx.
Sig.: Two pills three times a day.

In cirrhosis of the kidney, also, it is believed to have a special place. Following out the physiological action, we find that, in spinal sclerosis, premature senility, in depression and hypochondria, it has a high degree of efficiency. This salt is beneficial in the vertigo of the aged dependent upon atheromatous vessels, and also in vertigo due to indigestion. It is useful in hysteria and functional impotence. In spasmodic affections (whooping-cough, laryngismus stridulus) it has some advocates. Where amenorrhœa or dysmenorrhœa is due to deficient innervation, and not to local lesion or obstruction, this remedy has given good results, and also in habitual abortion. Uncomplicated chronic ovaritis is benefited by the administration of gold. It is probably true that the gold chloride is, in some cases, an efficient substitute for mercuric chloride in the treatment of syphilis, especially of the primary and secondary stages, and it has been tried in this combination, where there was an undue susceptibility to mercury, with decided benefit:—

℞ Auri et sodii chloridi, ... gr. j.
Ext. sanguinariæ, ... gr. ij.
Ext. calumbæ, ... gr. xxx.
M. Ft. pil. no. xxx.
Sig.: One pill three times a day.

Gold also proves of avail in the late manifestations of syphilis, and is sometimes effectual, after failure of the mixed treatment, by means of mercury and iodine. It has been of service in ulcerations of the throat,

ozæna, diseases of the bones, and syphilitic phthisis. Dr. J. A. Robinson reports two cases of diabetes mellitus in which the chloride of gold and sodium caused a steady decrease and final disappearance of glycosuria. In hypochondria and melancholia the chloride of gold and sodium is highly recommended. The bromide of gold has been used in epilepsy, with advantage, by Dr. Goubert, who administers it to adults in the daily dose of $\frac{1}{10}$ to $\frac{1}{6}$ grain, and from $\frac{1}{25}$ to $\frac{1}{10}$ grain to children. The remedy is given in solution. The same writer has found it beneficial in migraine, chorea, and exophthalmic goitre. The bromide has been of use in hysteria, hystero-epilepsy, and cerebral anæmia.

The cyanide of gold, a yellowish, crystalline, tasteless powder, insoluble in water, alcohol, and ether, has been used by Oesterlen in scrofula, phthisis, and amenorrhœa. The dose is $\frac{1}{60}$ to $\frac{1}{10}$ grain.

The chloride of gold enters into the treatment of tuberculosis by the Shurley-Gibbes method, and Dr. Joseph Drzewiecki reports the cure of a case of lupus by the internal administration of the same salt in the dose of $\frac{1}{150}$ grain three times a day.

AZEDARACH (U. S. P.).—**Azedarach.** (Pride of China.)

Pharmacology and Therapy.—The bark of the root of Melia azedarach (Meliaceæ) is used in our Southern States in the form of a decoction (℥iv to Oij, boiled down to Oj), as a vermifuge, $\frac{1}{2}$ ounce being given to a child every two or three hours until the bowels are freely moved. Large doses may cause vertigo, dilated pupils, and stupor. A fluid extract has been also used (dose, ʒj), but the fresh decoction is the best preparation.

BALSAMUM CANADENSE.—Canada Turpentine.

Dose, ♏v–x, preferably in capsules.

Pharmacology.—The fir, Abies balsamea (Coniferæ), is indigenous to the northern part of the United States and Canada. The balsam, or oleoresin, is obtained by collecting the juice, which naturally exudes upon the tree, and through spontaneous evaporation. It is a viscid, nearly transparent, yellowish liquid, of rather pleasant odor and bitterish taste, completely soluble in ether, chloroform, or benzol. When dried it is a clear mass, entirely without structure; so that it is useful in microscopic work.

Physiological Action and Therapy.—In their actions upon the human body, the various forms of turpentine resemble each other so closely as not to require separate treatment. It is probable that the good effects obtained by Mr. Clay and Paracelsus, in the treatment of uterine disease with Chian turpentine, might be obtained from our native turpentine. It may be administered in capsule or emulsion, and may also be applied

locally. As a surgical dressing it also is useful, owing to its adhesive and antiseptic qualities, resembling, in this respect, the balsam of Peru.

BALSAMUM PERUVIANUM (U. S. P.).—**Balsam of Peru.**

Dose, ♏x–xxx.

Pharmacology.—A balsam obtained from Myroxylon pereiræ (Leguminosæ, Papilionaceæ), a tree of Central America. It is a honey-like liquid, of fragrant odor and a warm, rather acid taste, containing resin, volatile oil, and both benzoic and cinnamic acids. It is inflammable, burning with a white smoke and fragrant odor. It is entirely soluble in 5 parts of alcohol, and should not diminish in volume when agitated with an equal bulk of benzin or water.

Physiological Action and Therapy.—Peruvian balsam is carminative, stimulant, and expectorant, and has been extolled in Europe by Landerer and Schnitzler, in phthisis pulmonalis and chronic bronchial catarrh, given in capsules or emulsion, and also used in an inhaler. As it is a deodorant and antiseptic, it is useful as a local application in recent wounds, compound fractures, and also in the treatment of ozæna, old ulcers, and in uterine affections :—

℞ Iodoformi,	ʒiv.
Balsami Peruviani,	ʒij.
Lanolini,	℥ij.

M. Sig.: For local application on absorbent cotton or carded wool.

In infantile eczema we may prescribe :—

℞ Acidi borici,	ʒss.
Balsami Peruviani,	gr. x.
Lanolini,	℥j.
Ol. amygdalæ expressi,	q. s. ft. ung.

M. Sig.: Apply frequently upon soft linen.

Leucoplakia, or local epithelial thickening of the mucous membrane, is removed by applications of Peruvian balsam; in leprosy it may be thoroughly rubbed into the affected areas. It is also a good local application for diphtheria.

BALSAMUM TOLUTANUM (U. S. P.).—**Balsam of Tolu.**

Dose, gr. v–x.

Preparations.

Tinctura Tolutana (U. S. P.).—Tincture of Tolu (10 per cent.). *Dose,* ♏x–xxx.

Syrupus Tolutanus (U. S. P.).—Syrup of Tolu (℥ij of tincture in Oj). *Dose,* f℥ss or more.

The compound tincture of benzoin contains in each pint ʒx of tolu.

Pharmacology and Therapy.—A balsam obtained from Myroxylon toluifera (Leguminosæ), a tree of New Grenada. It is a resinous exu-

dation, containing a volatile oil, toluene, with cinnamic and benzoic acids, and has an agreeable odor and taste. It is slightly antiseptic and expectorant; the syrup is a favorite basis for cough mixtures, chiefly on account of its pleasant taste. The balsam itself may be administered in emulsion with egg or mucilage. It should not be used during acute attacks of inflammation. The syrup covers the taste of chloral or croton-chloral (Brunton).

BAPTISIA.—Wild Indigo.

Preparations.

Extractum Baptisiæ.—Extract of Baptisia. *Dose*, gr. i–x.
Baptisin.—*Dose*, gr. i–v.

Pharmacology and Therapy.—The root of Baptisia tinctoria (Leguminosæ), indigenous to North America. **Baptisin,** an impure resin, is considered to have cholagogue properties (dose, gr. i–v), and has been found of service in amenorrhœa. The decoction or fluid extract may be used as a cathartic in large doses, or tonic astringent in small. In typhoid fever and bowel disorders, small doses of a tincture have been used, but not according to the best practice. The decoction may be employed as a douche in nasal catarrh, chronic ulcers, leucorrhœa, etc., or as a mouth-wash in stomatitis.

BARII CHLORIDUM.—Chloride of Barium.

Dose, gr. $\frac{1}{20}$–$\frac{1}{2}$.

Pharmacology and Physiological Action.—Barium, in its action upon the blood-vessels, resembles both ergot and digitalis. It causes the cardiac contractions to become more slow and forcible. Tonic spasm of involuntary muscular fibre is produced, peripheral blood-vessels are constricted, and blood-pressure rises. Peristalsis is likewise excited. Overdoses give rise to salivation, thirst, vomiting, purging, embarrassed breathing, slow pulse, dilated pupils, and paralysis of the extremities. Death has occurred in consequence of $2\frac{1}{2}$ grains, the quantity not having been taken in one dose, but in daily doses of $\frac{1}{4}$ grain. The symptoms of intoxication manifested themselves at the end of a week. This, however, must be regarded as an exceptional case. The drug, in small, medicinal doses, is devoid of active poisonous properties.

Therapy.—Barium chloride may be used as a cardiac tonic in valvular insufficiency with irregularity of the heart. In minute doses, it is a stimulant and alterant, and may be used in scrofula. It has yielded good results in varicose veins and aneurism. Barium chloride is useful in atony of the bladder or intestine and in the treatment of hæmorrhage.

BELLADONNÆ FOLIA (U. S. P.).—Belladonna-Leaves.

BELLADONNÆ RADIX (U. S. P.).—Belladonna-Root.

Preparations (from the leaves).

Extractum Belladonnæ Alcoholicum (U. S. P.).—Alcoholic Extract of Belladonna. *Dose*, gr. $\frac{1}{40}$–j.

Tinctura Belladonnæ (U. S. P.).—Tincture of Belladonna (15 per cent.). *Dose*, ♏v–xx.

Unguentum Belladonnæ (U. S. P.).—Ointment of Belladonna (contains, of the alcoholic extract, 10 per cent.).

Preparations (from the root).

Abstractum Belladonnæ (U. S. P.).—Abstract of Belladonna. *Dose*, gr. $\frac{1}{20}$–j.

Extractum Belladonnæ Fluidum (U. S. P.).—Fluid Extract of Belladonna. *Dose*, ♏$\frac{1}{10}$–ij.

Linimentum Belladonnæ (U. S. P.).—Liniment of Belladonna (contains, of fluid extract 95, camphor 5 parts).

Emplastrum Belladonnæ (U. S. P.).—Belladonna Plaster (representing full strength).

Active Principles.

Atropina (U. S. P.).—Atropine. *Dose*, gr. $\frac{1}{200}$–$\frac{1}{60}$.

Atropinæ Sulphas (U. S. P.).—Sulphate of Atropine. *Dose*, gr. $\frac{1}{200}$–$\frac{1}{60}$.

Homatropine (oxytoluylic acid-tropine), *Homatropine Hydrobromate*, a salt of the preceding, is largely used by oculists as a mydriatic in weak solution. It is a derivative from tropine amygdalate by the action of hydrochloric acid.

Benzoyl-tropine is a combination of benzoic acid with tropine.

Pharmacology.—The leaves and the root of Atropa belladonna (Solanaceæ), or deadly night-shade, are each officinal, and provide pharmaceutical preparations. It is a native of Europe, and is cultivated here. All parts of the plant are active, but the fleshy, creeping root is especially so. The erect, purplish, branching stems stand about three feet high, and the leaves with short stalks are in pairs of unequal size, oval, entire; the flowers are large, bell-shaped, pendent, and of a dull-reddish color, the short peduncles arising from the axils of the leaves. The fruit, somewhat resembling a cherry, has two cells containing numerous seeds and a sweetish, violet-colored juice; it has an adherent calyx at the base. The large, cultivated leaves are said to have less of the active principle than the smaller leaves gathered while the plant is in flower. The roots are taken from plants at least three years old; those which are tough and woody, breaking with a splintering fracture, should be rejected. Belladonna contains atropine and hyoscyamine, duboisine, or daturine (Ladenburg), which differ in chemical or physical characters more than in their physiological effects.

Physiological Action.—Locally, belladonna affects the end organs of the sensory nerves and reduces painful sensibility, contracts the vessels,

and checks the action of the sweat- and mammary- glands. It is readily absorbed through the unbroken skin, and symptoms of poisoning have appeared after its topical application. When applied to the eyes, belladonna widely dilates the pupil and relaxes the ciliary muscle, so as to temporarily paralyze the power of muscular accommodation of the eye. Applied to the throat, it produces dryness and choking sensations, and this is one of the first effects of its toxic action after it has been introduced into the system either by the mouth or by absorption.

Upon the brain it has an exhilarating effect, and a talkative delirium of mild form may appear. In some cases the delirium is of a violent type. Subsequently, sleep usually occurs. In the lower animals (frogs), atropine produces arrest of breathing, followed by convulsions. The transient flushing, or erythema, which appears after its use, is probably owing to its effects upon the sympathetic system as a stimulant. The influence of the drug upon the heart and circulation is believed to be indirect through the nervous system. Belladonna paralyzes the inhibitory filaments of the pneumogastric nerve, and as a result the heart, under the influence of the sympathetic plexus, runs at a rapid rate without being checked by the paralyzed pneumogastrics. The force of the heart's beat is also increased. Coincident with this, and as a result of its action upon the blood-vessels, we have increased arterial tension. The contraction of the smaller vessels may be due to action upon the muscular fibres of the walls, or it may be secondary to the action upon the nervous system. Respiration becomes more rapid owing to stimulation of the respiratory centre. The flow of urine is increased as the result of increased arterial tension, but there is no increase in the solid constituents of the urine. The secretions generally are checked, notably those of the mouth and skin; the flow of milk is also arrested by it. Though intestinal secretion is at first diminished, it is, probably, subsequently increased, since the alvine evacuations become more frequent and more liquid during the administration of belladonna. In small doses it strengthens the muscular coat of the bowel. Belladonna is eliminated chiefly by the kidneys.

Toxic Effects and Antidotes.—Poisonous symptoms occasionally appear as the result of the introduction of a very small quantity, either by absorption, as stated, or by passing from the eye into the nose, and thence into the throat. In such cases nothing more serious occurs than dryness of the throat, dilated pupils, possibly an erysipelatous or erythematous eruption upon the skin, and some fever and restlessness. Larger doses cause thirst, dryness, and aching of the fauces, flushing, rapid pulse, and hurried breathing, without decided increase of temperature, followed by coma or convulsions and death. The physiological antago-

nists which may be employed as antidotes are, morphine, physostigmine, muscarine, and jaborandi, or pilocarpine. These agents should be cautiously administered, keeping within safe doses. Animal charcoal, fixed alkalies, and demulcents, followed by free evacuation of the stomach and bowels, may also be prescribed.

Therapy.—Belladonna ointment, or the liniment of belladonna, may be used with good results in neuralgia and chronic rheumatism; also, in local sweating. In the form of atropine it is used as a mydriatic, but strong solutions are liable to cause glaucoma. The solutions of atropine for ophthalmic practice, or for use hypodermatically, should be freshly prepared each time, in order to avoid the development of penicillium in the liquid, which destroys the alkaloid, besides giving us an infected solution. In eye-practice it is used to dilate the pupil and relax the accommodation in order to facilitate examination of the eye and determine its refraction, and also to prevent adhesions between the pupillary border of the iris and the lens, or to avoid protrusion of the iris through an ulcer of the cornea.

Some oculists consider the santonate of atropine as the best combination as a mydriatic, but the sulphate of atropine is the salt generally employed, in from ¼ grain to 4 grains to the ounce. The same solution is beneficially used in treating diseases of the ear, pain from inflammation of the middle or external ear, or membrana tympani, or earache being relieved by dropping it in warm when necessary.

Rigidity of the os uteri during labor may be relieved by the local application of belladonna ointment. The same preparation is useful in spasm of the neck of the bladder or of the sphincter ani, and in vaginismus. It relieves the pain of herpes zoster, of irritable and malignant ulcers. It is serviceable in painful hæmorrhoids and fissure of the anus, checks the suppurative process in boils, and promotes the resolution of enlarged glands. For any local pain, Garretson recommends the appended formula, known as Ludlow's:—

℞ Atropinæ sulphatis,	gr. ss.
Aconitinæ,	gr. iss.
Olei tiglii,	gtt. ij.
Petrolati,	ℨij.

M. Sig.: To be used by rubbing in a piece about the size of an ordinary pea.

This ointment may likewise be advantageously employed in the relief of inflamed joints. The following are good combinations:—

℞ Ungt. belladonnæ,	ℨss.
Lanolini,	℥ss.
Cerati plumbi subacetat.,	ℨiij.
Ungt. zinci oxidi,	℥ss.

M. et ft. ungt.

Serviceable in furuncle, abscess, carbuncle, and herpes zoster.

℞ Cocainæ hydrochlorat., ... gr. v.
Ungt. belladonnæ, ... ℥j.
M. et ft. ungt.
A good application in ulcerated carcinoma, or sarcoma, irritable ulcers, etc.

The pupils and throat should be carefully watched when belladonna ointment is used upon open surfaces. Accidents, probably due to idiosyncrasy, sometimes follow the use of atropine solutions in the eye. In addition to the more usual manifestation of belladonna poisoning, cellulitis of the eyelids and face and epistaxis have been observed. Belladonna is an excellent local remedy in intercostal neuralgia or pleurodynia, and in the chest-pains of phthisis. The liniment may be applied with friction, and is the more cleanly agent, but strapping the chest with belladonna plaster is generally more efficient in neuralgia. The plaster usually affords considerable relief in irritable heart. The same preparation is effective in lumbago and myalgia. It may be spread upon the abdomen in uterine or ovarian neuralgia, or in these affections the agent may be employed according to the method of Trousseau. This consists in combining 1 or 2 grains of the extract with 6 or 8 grains of tannic acid, and applying it to the cervix uteri upon absorbent cotton, or introducing it into the vagina in the form of a suppository. This combination is often valuable in leucorrhœa :—

℞ Ext. belladonnæ alc., ... gr. xxiv.
Acidi tannici, ... ʒiss.
Olei theobromæ, ... q. s.
M. et ft. suppositoria no. xxiv.
Three or four suppositories may be used daily.

A suppository containing the extract of belladonna, alone or in union with opium, is very valuable in dysmenorrhœa dependent upon spasm of the cervix uteri. Belladonna, locally applied, has the power of alleviating that perversion of sensibility known as paræsthesia or pruritus. Hence, a lotion or ointment containing this agent may be successfully used in pruritus of the genitals, urticaria, and chronic eczema, attended with excessive itching. A prescription like the following may be written :—

℞ Naphthol., ... gr. xx.
Ungt. camphoræ,
Ungt. menthol., ... āā ʒij.
Ungt. belladonnæ, ... ℥ss.
M. et ft. ungt.

Or—

℞ Acid. carbolici, ... ʒss.
Linimenti belladonnæ, ... f℥ij.
Glycerini,
Aq. rosæ, ... āā f℥iv.—M.

The liniment of belladonna, applied locally several times a day, has a remarkable power in restraining excessive sweating. A solution of atropine in equal parts of alcohol and chloroform, the strength being 5 grains of the alkaloid to the ounce of menstruum, will sometimes, according to Bartholow, allay obstinate cerebral or reflex vomiting.

Instead of belladonna, atropine may be used in proper quantity in forming ointments and lotions. The following is an elegant ointment for use in chronic ovarian, uterine, or pelvic disease :—

℞ Atropin. sulphatis,	gr. ij.
Ol. neroli,	♏vj.
Ungt. aquæ rosæ,	℥ss.

M. et ft. ungt.

Belladonna is chiefly employed internally to alleviate pain, relax spasm, and check excessive secretion or morbid discharge. It is a valuable remedy in neuralgia, especially of the trifacial nerve, though other forms are frequently amenable to its influence. Anstie esteemed it superior to any other agent in neuralgia of the pelvic viscera. Atropine is often productive of the happiest results in gastralgia, enteralgia, and gastric ulcer. As neuralgia is often expressive of insufficient nutrition and is generally associated with anæmia, a combination of belladonna with iron, strychnine, and other tonic drugs is frequently successful. A formula similar to the following has been widely used :—

℞ Extr. belladonnæ,	gr. iij.
Quinin. sulphat.,	gr. xviij.
Ferri sulphat. exsic.,	gr. vj.
Strychnin. sulphat.,	gr. $\frac{1}{6}$.
Acid. arseniosi,	gr. $\frac{1}{4}$.
Oleoresinæ piperis,	♏vj.

M. et ft. pil. no. xij.
Sig.: A pill thrice daily.

For the relief of migraine, Trousseau was accustomed to administer $\frac{1}{6}$ grain of the extract of belladonna every hour until the symptoms vanished or vertigo made its appearance. The tincture or fluid extract of belladonna, or sulphate of atropine, is useful in relieving the spasm of laryngismus stridulus, hiccough, spasm of the œsophagus, or local convulsive manifestations of hysteria. Intestinal, hepatic, or renal colic is ameliorated by this remedy. Belladonna is of service in epilepsy, but needs to be given persistently in gradually increasing doses for a long period of time. It is particularly applicable to the *petit mal* or nocturnal epilepsy and to anæmic subjects. Belladonna is one of the most esteemed remedies for whooping-cough. It should be exhibited in sufficiently large doses to produce dilatation of the pupils, and is generally

well borne by children in proportionately large doses. Belladonna is sometimes of signal service in spasmodic asthma. The most advantageous method of administration is that proposed by Dr. Salter, 10 minims of the tincture being repeated every two or three hours until disturbance of vision occurs or relief is obtained. The paroxysm may likewise be alleviated, though less certainly, by smoking belladonna-leaves in a pipe, or made into a cigarette. The tincture of belladonna is capable of affording marked benefit in exophthalmic goitre. When nocturnal incontinence of urine is caused by spasmodic contraction of the bladder, the fluid extract of belladonna is the best remedy which can be employed. The same treatment may be of avail in the incontinence of the aged. The sulphate of atropine possesses considerable efficacy in spermatorrhœa and prostatorrhœa. It is best given at bed-time. Torticollis and muscular cramps are generally ameliorated by belladonna. Præcordial pain and overaction of the heart are relieved by the internal use of belladonna. This drug enters very serviceably into remedies for habitual constipation. In disease of the kidney it relieves congestion by its action on the arterioles. In typhoid and typhus fevers, Dr. John Harley has derived decided advantage from the use of belladonna, which cleans and moistens the tongue and quiets the brain. Inflammation of the pharynx and tonsils is lessened by the use of belladonna, which may, with great utility, be combined with aconite and given in a solution of chlorate of potassium. A suitable prescription may be thus formed :—

℞ Potass. chloratis,	℈iv.
Acid. hydrochloric., dilut.,	fʒiss.
Tr. aconiti,	♏xvj.
Tr. belladonnæ,	fʒss.
Infus. rhus. glabr., q. s. ad	f℥iv.

M. et ft. sol.
Sig.: Tablespoonful every third hour.

On account of its beneficial influence upon the throat, belladonna has been used in scarlatinal angina. Much has been written concerning its value as a prophylactic in scarlatina, but in the experience of the author no reliance can be placed upon the drug as a preventive of that disease. It possesses some virtue as an internal remedy in erysipelas, and in this affection also is usefully given in conjunction with aconite, especially if much fever and delirium are present. It is sometimes able to check the vomiting of pregnancy. Aphonia due to fatigue of the cords soon disappears under the use of atropine. Belladonna is useful in allaying nervous cough, and, according to Bartholow and Fothergill, has an excellent effect in caseous pneumonia, provided it be given in the stage of deposit before softening has taken place. Small doses of belladonna

or atropine three or four times a day check the profuse discharge of mercurial ptyalism. The free sweating which occurs in weakly children after slight exertion or during sleep is suppressed by belladonna. The copious watery discharge of the first stage of acute coryza is controlled by atropine, which is one of the best remedies also in the night-sweats of phthisis, given at bed-time in the dose of gr. $\frac{1}{80}$–$\frac{1}{60}$. The free discharge of chronic bronchitis is restrained by belladonna. Atropine is a valuable agent for diminishing the effect of shock. It may be given, in the dose of gr. $\frac{1}{100}$–$\frac{1}{75}$, hypodermatically, after a severe injury or prior to a surgical operation; also, in shock in the stage of collapse in cholera.

In many cases it is advisable to inject atropine into the affected tissues (parenchymatous administration). In deep-seated neuralgia of large trunks, as, for instance, in sciatica, the most rapid relief is obtained by this method. In sciatica and myalgia it is a good plan to combine a small quantity (gr. $\frac{1}{8}$) of sulphate of morphine with the atropine solution for subcutaneous injection. The effect of each alkaloid is heightened by the combination. Stirling has found the hypodermatic use of gr. $\frac{1}{150}$ of atropine valuable in a case of hæmorrhage from the lungs. In tic douloureux, likewise, atropine thrown under the skin is especially useful.

BENZINUM (U. S. P.).—**Benzin.**

Dose, ♏x–xxx, in mucilage, or capsule.

Pharmacology.—A purified distillate from American petroleum, consisting of hydrocarbons, chiefly of the marsh-gas series, and having a specific gravity of from .670 to .675, and boiling at 50° to 60° C. (122° to 140° F.). Benzin, or petroleum ether, is a clear, colorless, diffusive liquid, yielding inflammable vapors, which, when mixed with air, are explosive; it, therefore, should be kept in a cool place, remote from lights or flame. Soluble in alcohol, ether, and oils, but insoluble in water. Fats, resins, and caoutchouc are dissolved by it. It is used in pharmacy in making mustard leaves, extracting oleoresins, and other manipulations in which its solvent power is utilized.

Physiological Action.—Benzin resembles oil of turpentine in its local effects, especially when applied with friction. It is likewise an irritant when swallowed, but does not cause vomiting nor diarrhœa. It produces intoxication, faintness, headache, palpitation, or convulsions, which may end fatally; death may also be caused by gastro-enteritis, though relatively large amounts have been taken and the poisonous action overcome. The treatment should be directed toward evacuating the stomach and bowels, and counteracting the effects of the agent by diffusible stimulants and atropine, or ether, hypodermatically.

Therapy.—Externally, benzin is used as a counter-irritant, applied

upon a flannel bandage, or with friction, for neuralgic or rheumatic pains, but its odor is penetrating and unpleasant. Internally, it is not used in medicine, although it is a domestic remedy for lumbricoid worms and tænia. It is claimed to be a good parasiticide in itch and pediculosis. (See Petroleum.)

BENZOINUM (U. S. P.).—**Benzoin.** (Gum Benjamin.)

Preparations.

Adeps Benzoinatus (U. S. P.).—Benzoinated Lard (2 per cent.).

Acidum Benzoicum (U. S. P.).—Benzoic Acid. *Dose*, gr. x–xxx.

Tinctura Benzoini (U. S. P.).—Tincture of Benzoin. *Dose*, f℥ss.

Tinctura Benzoini Composita (U. S. P.).—Compound Tincture of Benzoin (benzoin 12, aloes 2, storax 8, tolu 4, alcohol q. s. ad 100 parts). *Dose*, f℥ss–ij.

The benzoates of ammonium, of lithium, and of sodium are officinal.

Pharmacology.—Benzoin is a gum or balsamic resin obtained from Styrax benzoin (Styraceæ), a tree of the East Indies, containing an abundance of resinous fluid, which exudes from incisions made into the bark. The best quality is in light lumps or tears, but it also occurs in large masses. It contains, besides resin and a volatile oil, from 14 to 20 per cent. of benzoic acid, which may be extracted either by washing the resin with lime-water or by distillation. It should not contain cinnamic acid in appreciable quantity. Benzoic acid is in white, lustrous scales, or friable needles, permanent in air, having a slight, aromatic odor of benzoin, a warm, acid taste, and an acid reaction. Soluble in 500 parts of water, 15 of boiling water, in 3 of alcohol, or 1 of boiling alcohol. It is volatilized by heat. Two other sources of the benzoic acid of commerce are known; it is a derivative of toluol and also of hippuric acid, the hippuric acid being derived from the urine of horses and cattle. The benzoic acid may retain some traces of its source, and, therefore, the pharmacopœia directs that it shall smell of benzoin. Benzoin prevents fat from becoming rancid, and hence it is, in small quantity, a useful addition to ointments.

Physiological Action.—In solution in the form of the tincture, benzoin is protective to excoriated surfaces, and, like other gums, is antiseptic. After absorption, it has a stimulating effect upon mucous membranes; part of it is decomposed in the system to form hippuric acid, and, being excreted by the kidneys, increases the acidity and the quantity of the urine. Benzoic acid has some power in preventing the growth of bacteria,* possessing the advantage over carbolic acid of being non-poisonous. The benzoate of sodium has a stimulating effect upon the liver.

Therapy.—The tincture, especially the compound tincture, is used to paint over abrasions and excoriations in order to protect the surface,

* See page 107.

particularly in cases of tender nipples. It may also be painted on the skin for chilblains after bathing the surface with 5-per-cent. solution of carbolic acid. It was formerly employed as a dressing for ulcers. As an expectorant we may give tincture of benzoin in chronic bronchitis, and the officinal camphorated tincture of opium (paregoric elixir) contains 30 grains to the pint. In troublesome cough the combination with opium is necessary, although the opium checks secretion and expectoration; a better combination would be

℞ Codeina,	gr. vj.
Acidi benzoici,	℥iv.
Syr. tolutani,	
Aquæ camphoræ,	āā f℥iij.

M. Sig.: Take a dessertspoonful every four hours.

Inhalations of steam impregnated with the compound tincture of benzoin are beneficial in acute and chronic laryngitis. Morell Mackenzie uses a vapor of the compound tincture of benzoin, 1 drachm to a pint of water at 140° F., inhaled frequently for acute laryngitis.

In liver disorders, benzoate of sodium, in 10- to 30-grain doses, is very useful, and also in cystitis. This salt is also of service in septic and febrile diseases, several drachms daily (Senator). Owing to its solubility it is preferable to benzoic acid, and is equally as efficient in acute rheumatism. In scarlet fever and small-pox the benzoate of sodium reduces the temperature and mitigates the severity of the disease. This salt has proved very useful in the treatment of diphtheria, administered internally, and at the same time applied by insufflation to the seat of the lesion. Its employment has seemed to be attended with good results in typhoid fever and whooping-cough. The same remedy in the form of a spray has been extolled in phthisis, but it has no such decided effect upon the tubercle bacilli, as had been hoped. Benzoic acid, in daily doses of 2½ to 3 drachms, has been found of service in acute rheumatism, but is inferior to salicylic acid. In its exit from the system this acid acts as a gentle stimulant and local antiseptic to the bladder and urethra. In chronic cystitis with fermentation of urine and deposit of phosphates, benzoic acid is extremely useful, reducing the alkalinity of the fluid and the irritability of the bladder. For similar reasons it sometimes proves of service in chronic gonorrhœa, in obstinate irritation of the urethra due to the condition of the urine, and in incontinence caused by an alkaline reaction of the urine. In all these conditions the benzoate of ammonium may be used instead of the acid. The usual dose of the acid is 5 to 10 grains, of the salt 10 to 20 grains. In uræmic conditions, or what has been called lithæmia, the benzoate of lithium has a most happy effect, carrying off the excess of uric acid and urates, and acting also as a

diuretic. Even in albuminuria, the benzoates have been used with advantage, especially the benzoate of lime.

Freckles may be removed by the topical application of tincture of benzoin, containing corrosive chloride of mercury.

℞ Hydrarg. chlor. corrosiv.,	gr. ss.
Tinctura benzoini,	f℥iiss.
Glycerini,	f℥ij.
Aquæ rosæ,	f℥vj.

M. Sig.: Use as a lotion to affected spots.

The above may also be used in pityriasis versicolor, or moth-spots, and chronic urticaria. The compound tincture of benzoin is sometimes able to relieve the itching of urticaria and eczema. A solution of benzoic acid in cologne-water makes a pleasant application, frequently successful in urticaria. Mixed with an equal quantity of glycerin, the tincture or the compound tincture is useful in chapped lips and hands. The compound tincture is a good styptic, and yields excellent results when injected into old sinuses. It disinfects the tract, and promotes healing. Benzoic acid is an efficient antiseptic application to unhealthy wounds and ulcers. The benzoate of bismuth is an excellent dressing to chronic, unhealthy, or sloughing ulcers, chancroids, open buboes, chancres, and ulcerated lesions of late syphilis. It is applied in the form of a powder, the surface having previously been thoroughly cleansed by a weak solution of corrosive sublimate.

BENZOLUM, or BENZOL.

Pharmacology.—Benzol is often confounded with benzin, but is entirely different. Benzol is obtained from coal-tar, and is a definite chemical compound (C_6H_6), instead of being composite like benzin. It is a thin, colorless fluid, very volatile and inflammable, and has an aromatic, not very unpleasant odor. It is almost insoluble in water, but dissolves in four parts of alcohol. It may be obtained by distilling a mixture of benzoic acid with lime, or by fractional distillation from naphtha,—a derivative of coal-tar.

Physiological Action.—Benzol is antiseptic and antiparasitic, with but little local action beyond the extraction of oily matters from the skin. Owing to its solvent action upon many alkaloids, it might be useful in local medication by enabling the remedy to penetrate the skin. Taken internally, benzol produces intoxication, anæsthesia, and coma.

Therapy.—It has been given in a few drop doses as a remedy for dyspepsia, and also in trichinosis. It is employed in pharmacy as a solvent, and in the household to remove paint, oil, grease, or tar from the clothing, very largely, but is not often administered or employed in practical medicine.

BERBERIS.—Barberry.

Preparations.

Extractum Berberidis Fluidum.—Dose, ♏x–xxx.
Tinctura Berberidis.—Dose, ♏xx–f℥j.
Berberina, or *Berberinæ Hydrochloras.*—Hydrochlorate of Berberine. *Dose,* gr. ¼–v.

Pharmacology and Therapy.—The root of the Oregon grape, or Berberis aquifolium (Berberidaceæ), growing on the Pacific Slope of North America, contains an alkaloid, **Berberina,** or Berberine, which also exists in Hydrastis.

This drug, in the form of fluid extract (dose, ♏x–xxx), is tonic and diuretic, and is believed to have some power as an alterative, making it valuable for the treatment of blood diseases, dyspepsia, hepatic disorder, habitual constipation, and skin diseases dependent upon unhealthy secretions or conditions of the digestive tract.

BERGAMIA.—Bergamot.

Preparation.

*Oleum Bergamii** (U. S. P.).—Oil of Bergamot.

Pharmacology and Therapy.—A volatile oil from the Citrus bergamia (Aurantiaceæ), obtained from the rind of the fresh fruit, which also contains **Bergaptene,** or bergamot camphor. The odor makes bergamot valuable in perfumery; and it probably has antiseptic and stimulating qualities, but is not used medicinally.

BETA.—Beet.

Pharmacology and Therapy.—The fleshy napiform root of Beta vulgaris (Chenopodiaceæ) is cultivated for food, as a vegetable, and from its saccharine juice a good quality of sugar is obtained. A strong infusion of the fresh root (f℥ii–iv, taken at bed-time or early in the morning) is said by Kazatchkoff to be useful in the treatment of chronic constipation and hæmorrhoids. It is claimed that it does not cause pain or rumbling.

BISMUTHUM.—Bismuth.

Preparations.

Bismuthi Citras (U. S. P.).—Citrate of Bismuth. *Dose,* gr. i–v.
Bismuthi Subcarbonas (U. S. P.).—Subcarbonate of Bismuth. *Dose,* gr. v–xx.
Bismuthi Subnitras (U. S. P.).—Subnitrate of Bismuth. *Dose,* gr. v–xx.
Bismuthi et Ammoniæ Citras (U. S. P.).—Citrate of Bismuth and Ammonium. *Dose,* gr. i–v.
Bismuthi Salicylas.—Salicylate of Bismuth. *Dose,* gr. i–xx.
Bismuthi Oleas.—Oleate of Bismuth (20 per cent.). External use.
Bismuthi Subiodidum.—Subiodide of Bismuth. External use.

* This is the title in the U. S. Pharmacopœia; it should be Ol. Bergamiæ.

Pharmacology and Physiological Action.—Bismuth in the metallic form is not officinal, and has no medical interest. Its salts, however, are of great value; the insoluble ones differing greatly in their applications from those which are soluble. The subnitrate and subcarbonate are or should be in the form of white, impalpable powder, which has a slight astringent and absorbent action when dusted upon excoriated or ulcerated surfaces. When taken internally, these salts have very much the same effect along the digestive tract as upon the surface of the body, checking excessive secretion and exerting a sedative influence. When injected under the skin, part of the salt is absorbed and poisoning may result. Or, if large doses are taken by the mouth, death may follow from gastro-enteritis, the symptoms being very much like those caused by gold, lead, and mercury. After death, bismuth is found in the liver and other viscera, and in the urine and saliva. A purplish line upon the gums, recalling that of lead, has been noticed. The treatment is by demulcents, washing out the stomach, and the administration of the antidotes to arsenic, with which native bismuth is usually combined. When the soluble preparations are given for a considerable time, the bismuth is apt to accumulate in the liver; but this is not likely to follow the administration of the insoluble salts. The solutions, or elixirs, purporting to contain bismuth in combination with pepsin are both unscientific and dangerous. The discharges from the bowels are blackened by bismuth.

Therapy.—In using bismuth it is essential that it shall be pure and free from arsenic. When well made, the subnitrate or subcarbonate is very useful as a dusting-powder for infants, or for intertrigo in adults. It has also been used to dust over excoriated surfaces, and as a dressing after wounds or amputations; in this case its weight is an objection to its employment; but it is very valuable in small wounds and in some old ulcers. Combined with mucilage (ʒj to ℥vi–viij), it is a good injection for gonorrhœa during the early stage; or it may be used as a soluble bougie, or as a vaginal suppository for leucorrhœa. The same preparation is likewise useful in ulcer of the rectum.

A small proportion of carbolic acid or aristol will enhance its antiseptic effect. In acne, intertrigo, and erythema in infants, or vesicular eczema, the bismuth may be lightly dusted over the surface. In the case of wounds the red oxyiodide is preferred to iodoform as an antiseptic and as an ointment in skin diseases. This salt is a local anæsthetic and antiseptic. It does not stain the skin or clothing, and may be employed as a dusting-powder or an ointment. It is an excellent application to chancres, chancroids, open buboes, ulcers, unhealthy wounds, and phlegmonous erysipelas. The following is a good combination:—

℞ Naphthalini, ... ʒss.
Bismuthi subiodidi, ... ʒj.
Unguenti simplicis, ... ʒviss.
M. et ft. ungt. Useful upon chancres, chancroids, and syphilitic ulcers.

The yellow oxyiodide is more suitable for mucous membranes (dose, gr. v–xx).

Bismuth-powder has been used with success in simple ozæna, snuffed into the nostrils, though it is inferior to other remedies. It may also be employed in aphthous or nursing sore mouth, and in mercurial ptyalism. It may be of service in chronic conjunctivitis and granular lids. Made into an ointment, the subnitrate of bismuth is an excellent application to chancroids, irritable ulcers, erysipelas, blisters, pemphigus after the bullæ have ruptured leaving raw surfaces exposed, the erythematous and bullous forms of burns, and in the first stage of dermatitis. In these conditions an ointment may be thus composed:—

℞ Bismuthi subnitratis, ... ʒss.
Pulv. marantæ, ... ℥ss.
Morphinæ sulphatis, ... gr. iij.
Lanolini, ... ℥ss.
M. et ft. ungt.

An ointment containing the oleate of bismuth is also valuable in diseases of the skin (see page 383). It may be prescribed as follows:—

℞ Extr. belladonnæ alc., ... gr. x.
Extr. opii, ... gr. xx.
Ungt. bismuthi oleatis, ... ℥ss.
M. For furuncles, carbuncles, and eczema of the genitals.

The internal administration of bismuth preparations is for their local action upon the stomach and intestinal tract. They form a coating over the inflamed or irritated surfaces and keep them from coming in contact, while they also exert an astringent and sedative effect. In gastralgia, irritable stomach, and some dyspeptic conditions they are of much value:—

℞ Bismuthi subnitratis, ... ʒij.
Pepsini saccharati, ... ʒj.
Creasoti, ... ♏iv.
M. Divide in chartulæ no. xij.
Sig.: Give one every hour until relieved. (The oil of gaultheria may be substituted for the creasote, in case of children, and the powders made smaller.)

Bismuth may be given in powder also, as:—

℞ Bismuth. subnit.,
Magnesii carbonatis, ... āā ʒj.
Morphinæ sulphatis, ... gr. j.
M. et ft. chartæ no. xij.
Sig.: A powder every hour or two. Employ in gastralgia, dyspepsia attended with acidity, and in cancer of the stomach.

In children suffering with irritable stomach the result of improper feeding, a good combination is :—

℞ Bismuth. subnit., ... ʒss.
Sodii bicarb.,
Pulv. rhei, ... āā gr. x.
M. et ft. chartæ no. x.
Sig.: A powder every four hours.

The following liquid combinations of bismuth are likewise of service, especially in gastric catarrh and some varieties of dyspepsia :—

℞ Bismuth. citratis, ... ʒij.
Glycerini pepsinæ, ... f℥iij.
M. Sig.: A teaspoonful before meals.

℞ Bismuth. subnit., ... ʒij.
Pulv. rhei, ... ʒiss.
Pulv. acaciæ, ... ʒij.
Spt. myristicæ, ... fʒij.
Aquæ menth. pip., ... f℥viij.
M. Sig.: A tablespoonful in water every four hours.

In gastro-enteritis, or summer complaint in young infants, the salicylate gives excellent results in 1- or 2- grain doses. This combination is likewise valuable in the diarrhœa of typhoid fever, in which it is serviceably given with naphthol.

Gastric ulcer is much benefited by the subnitrate in 10- or 15- grain doses, given every three hours, or oftener, if there is much pain. Where malignant ulceration is suspected, opium and belladonna may be administered at the same time. The vomiting of pregnancy may sometimes be relieved by bismuth subnitrate. It serves a useful purpose in the chronic gastritis so common in drunkards. In acidity of the stomach it is useful, and in flatulent dyspepsia. A combination of bismuth with charcoal is efficacious in the latter condition, as—

℞ Bismuthi subnitratis,
Pulveris aromatici, ... āā ʒij.
Carbonis ligni (recentis), ... ℥ss.
M. et div. in chart. no. xij.

In diarrhœa, the subnitrate is usually a reliable remedy, but, as Ringer advises, it should be preceded by a dose of castor-oil, in order to remove any possible cause of irritation. In the diarrhœa of phthisis, it can be given in combination with pepsin or pancreatin. It may be given in hot milk to children; but it is almost tasteless, and may be placed at once upon the tongue and washed down with water or milk. In chronic diarrhœa, the subnitrate of bismuth not infrequently affords marked

relief. An excellent prescription for diarrhœa, particularly when acute, is :—

℞ Bismuth. subnit., ... ʒiss.
Pulveris myristicæ, ... ℈ij.
Aquæ cinnamomi,
Syrup. acaciæ, ... āā f℥ij.
M. Sig.: Two teaspoonfuls every half-hour, or hour, until relieved.

A solution of citrate of bismuth and ammonia (representing about 3 grains of the oxide in each drachm) is officinal in the British Pharmacopœia :—

℞ Bismuthi et ammoniæ citrat., ... gr. v.
Aquæ chloroformi, ... f℥ss.
Elixir aurantii, ... f℥iss.
M. Sig: Take half an ounce three or four times daily, for irritable stomach.

P. Vigier has prepared a benzoate of bismuth as a substitute for the salicylate or subnitrate of bismuth. The benzoate of bismuth contains 27 per cent. of benzoic acid, and may be advantageously used as an intestinal antiseptic, and is a preferable substance to the salicylate as regards its elimination by the kidneys.

Dermatol.—Under this name Drs. Heinz and Liebrecht have introduced a new combination,—the subgallate of bismuth. This occurs in the form of a fine, saffron-yellow powder, odorless and innocuous; insoluble in water, alcohol, and ether; not hydroscopic, or otherwise affected by exposure to air or light. It possesses astringent, antiseptic, and desiccant properties. It is of especial value in lesions attended by profuse secretion, as eczema, burns, ulcers, wounds, and diseases of the eye and ear. Dr. Eugene Doernberger reports excellent results from the use of dermatol in pemphigus, herpes zoster, and abscesses of the skin occurring in children.

BRAYERA (U. S. P.).—Brayera (Koosso or Kousso).

Preparations.

Extractum Brayeræ Fluidum (U. S. P.).—Fluid Extract of Brayera. *Dose*, ♏xx–fʒij.
Infusum Brayeræ (U. S. P.).—Infusion of Brayera (6 per cent.). *Dose*, f℥iv–viij.
Kosin.—The active principle. *Dose*, gr. v–xx.

Pharmacology and Therapy.—Brayera is the female inflorescence of Brayera anthelmintica (Rosaceæ), a tree of Abyssinia. Kosin is a crystalline substance of acid reaction, combined with tannic acid, a volatile oil, and a resinous substance (kousseïn), which is an impure kosin. In large doses, brayera is a gastro-intestinal irritant, and is liable to cause vomiting. It is usually administered in infusion for the expulsion of tape-worm. It should be followed by a purgative in about two hours,

castor-oil being ordinarily used. Kosin, in 20-grain doses, is said to be less liable to cause nausea than the fluid preparations. Brayera should not be given during pregnancy, for fear of causing abortion.

BROMUM (U. S. P.).—**Bromine.**

Dose, ♏ii–iij.

Preparations.

Ammonii Bromidum (U. S. P.).—Bromide of Ammonium. *Dose*, gr. x–xl.
Calcii Bromidum (U. S. P.).—Bromide of Calcium. *Dose*, gr. v–xxx.
Potassii Bromidum (U. S. P.).—Bromide of Potassium. *Dose*, gr. x–ʒj.
Lithii Bromidum (U. S. P.).—Bromide of Lithium. *Dose*, gr. v–xx.
Sodii Bromidum (U. S. P.).—Bromide of Sodium. *Dose*, gr. x–ʒj.
Zinci Bromidum (U. S. P.).—Bromide of Zinc. *Dose*, gr. i–ij.
Acidum Hydrobromicum Dilutum (U. S. P.).—Dilute Hydrobromic Acid (10 per cent.). *Dose*, ♏xx–fʒij
Syrupus Ferri Bromidi (U. S. P.).—Syrup of Bromide of Iron (10 per cent.). *Dose*, ♏x–fʒj.
Camphora Monobromata (U. S. P.).—Monobromate of Camphor. *Dose*, gr. v.
Niccoli Bromidum.—Bromide of Nickel. *Dose*, gr. i–v.
Coninæ Hydrobromicum.—Hydrobromate of Conine. *Dose*, gr. $\frac{1}{16}$–$\frac{1}{12}$.
Bromoform.—Tribromo-Methane. *Dose*, ♏ii–x.

Pharmacology.—Bromine, which obtains its name from its offensive odor, is a brownish-red, non-metallic liquid element, obtained from sea-water; combining readily with alcohol, ether, or chloroform, and soluble in 33 parts of water at 59° F. When added to water, ozone is liberated. It completely volatilizes upon exposure to the air, giving off a highly irritating, suffocating odor like that of chlorine, with which it may be contaminated. The pharmacopœial tests require the chlorine to be not more than 3 per cent., and that there shall be only traces of iodine.

Physiological Action.—It is unfortunate that the smell of bromine is so obnoxious, since it is a true disinfectant, rivaling mercuric chloride, and, it is claimed, has even more influence than that agent, in preventing the development of spores. A 2-per-cent. solution in water destroys the spores of anthrax. Applied to the skin, it is a penetrating caustic in its pure state, and, diluted, is astringent and antiseptic. Internally, its effects resemble those of iodine and chlorine, causing paralysis of the brain-centres, death resulting from paralysis of respiration. After death the bromides are found in the brain, principally (Doyon).

In cases of poisoning by swallowing this agent, the stomach must be thoroughly irrigated, and a purgative like croton-oil administered in alkaline solution (Vichy water). When inhaled, warm vapor from the steam-atomizer with alkaline solution (Dobell's solution) would afford relief to the irritation. The bromides taken upon an empty stomach in concentrated form sometimes cause gastralgia, which may be relieved by hot water and a hypodermatic injection of morphine, combined with atropine, if stupor be present.

In medicinal doses, the bromides and hydrobromic acid exert a sedative effect upon the functions of the brain, produce insensibility of the mucous membrane of the fauces, and allay irritability of sensory nerves, as is very well shown in the case of tinnitus aurium after administration of quinine. It has some special effect upon the genito-urinary tract, obtunding sensibility and preventing erections or ovarian excitement. This is probably due largely to the influence of the bromides upon the spinal cord, reducing reflex action and, when continued, diminishing motor power and producing paralysis of the legs. The circulation is also affected by action upon the cardiac ganglia. In the case of bromide of potassium, we have superadded the toxic action of potash upon the heart-muscle, by reason of which, when given in large doses, the arterial tension is reduced and the pulse-rate lowered. In the usual doses this effect is hardly observable. It is said (by Hammond) to reduce the cerebral circulation, causing anæmia by contraction of the arterioles. It is probable that the hypnotic effect of bromides is due more directly to their action upon the brain-centres, especially the motor and intellectual portion of the cortex cerebri. To its faculty of reducing reflex nervous excitability is to be ascribed its well-known antispasmodic effects in convulsive disorders. No marked effect upon temperature or respiration has been observed from medicinal doses; very large doses may reduce both, and also diminish tissue-waste.

The rate and the force of the heart's action are likewise diminished and arterial pressure reduced by excessive doses. When continually administered in moderately large doses, the bromides sometimes excite nausea and diarrhœa. A sedative action is exerted by the bromides upon the sympathetic nervous system.

The bromides have considerable diffusive power, and are found in most of the secretions and in the interior of glands like the liver. The glandular elements of the skin are stimulated and an acneiform eruption follows their prolonged use. They are eliminated from the system by the secretions generally, but more particularly by those of the fauces, skin, bronchi, bowels, and kidneys.

Therapy.—For its caustic effect, bromine has been used in alcohol (1 to 2 or 3) in hospital gangrene, and in gynæcology as an application to cancer of the uterus. Diluted with sweet-oil (♏x to ℥j), it is a sedative dressing for rhus-poisoning or chancroids. Bromine is employed, like carbolic acid, as a disinfectant for drains, but is too offensive for use in this way in the sick-room. The bromides are not often used as topical remedies, though an aqueous solution of the strength of 10 or 20 grains to the ounce may be serviceable in paræsthesia. Finely-powdered bromide of potassium is stimulant to chronic ulcers, and has been advantageous

in epithelioma. It has been applied, added to 5 parts of glycerin, to hæmorrhoids and fissure of the anus, in order to relieve pain. In treating laryngeal diphtheria, or membranous croup, the following may be used :—

℞ Bromi,	♏v.
Potassii bromidi,	ʒj.
Syrupi simplicis,	fʒviiss.
Decocti althææ, q. s. ad	f℥iv.—M.

For a child of 1 year the bromine should be reduced to one-third, and from 1 to 4 years two-thirds, of the quantity in this formula, of which an ounce is to be given every hour, while the symptoms are urgent (Redenbacher). The officinal solution of hydrobromic acid has not answered the expectation of those who urged its use as a substitute for the bromides; it may be less liable to produce acne, but it is irritating and less efficient. It may be given for the relief of tinnitus aurium, headache, or to prevent unpleasant symptoms from the effects of quinine.

℞ Quininæ hydrobromat.,	gr. xxiv.
Acid. hydrobromic. dilut.,	f℥ss.
Elixir. aurantii,	f℥iiiss.

M. Sig.: Dose, a tablespoonful after meals.

Special Applications.—The special use of the bromides is found in the treatment of convulsive disorders, such as spasm of the larynx or epilepsy. In the former affection a few doses of 10 or more grains in a child are usually sufficient to accomplish a cure; but in the latter the treatment often extends over months and years. When the bromides are to be continued for a long time, **bromism** is apt to be produced, the physiological action of bromine being shown by eruptions upon the skin, especially of the face, loss of reflexes, dragging, heavy sensations, and difficulty in locomotion, and in some cases special tendency to convulsive attacks appear. It therefore becomes necessary to intermit the bromide or change from one to another, and if there is too much depression of the vital powers digitalis may be prescribed in combination, or strychnine given hypodermatically in minute doses (gr. $\frac{1}{120}$–$\frac{1}{60}$) several times daily. Brown-Séquard prefers a combination like the following, in treating epilepsy, for a child 10 years of age :—

℞ Potassii iodidi,	ʒj.
Potassii bromidi,	℥j.
Ammonii bromidi,	ʒiiss.
Potassii bicarbonatis,	gr. xl.
Spiritus chloroformi,	fʒij.
Infusi columbæ, q. s. ad	f℥vj.

M. Dose, two drachms morning and noon and three drachms at night, diminishing the quantity after the convulsions cease, but continuing the remedy at intervals, especially at the time when the fits are liable to recur. If the patient be weak, the infusion of digitalis may be substituted for the columbo.

In treating epilepsy the partial insensibility of the fauces is the guide to the administration of bromides; this should be established as soon as possible and maintained during the continuance of the treatment, which should not be pushed to the point of bromism. Small doses of arsenic will prevent, to some degree, the eruption in persons especially susceptible to bromides, and it is well to alternate the iodides with the bromides in order to prevent undue accumulation of the latter in the system. The beneficial action of the bromides is particularly marked when epilepsy is due to disorder of the sexual apparatus. On the other hand, the petit mal is much less amenable to their influence than the general convulsive seizures. The bromide of potassium has a certain sphere of usefulness in whooping-cough. It is of no avail when the bronchitis is severe, or when pneumonia is present; but in simple uncomplicated pertussis, above all when convulsions or a tendency to convulsions exist, this remedy is of great service in allaying the congestion of the nervous centres. Spasmodic asthma is, in some instances, considerably benefited by the exhibition of bromide, and its efficacy is enhanced by combination with the iodide. The bromides are of decided value in infantile convulsions, especially when these depend upon reflex irritation. They are likewise of service in the convulsions symptomatic of simple meningitis, and not altogether without avail in alleviating those of tubercular meningitis. Uræmic convulsions may sometimes be successfully treated by bromide of potassium in combination with chloral hydrate, assisted by active purgation and diaphoresis. When cholera infantum is associated with excessive nervous irritability, the bromide of potassium serves a useful purpose, as it does also in those cases in which flatulent colic of infants is connected with marked intestinal spasm. In treating nervous irritability, restlessness, and insomnia, it is well to combine bromides with other hypnotic agents.

℞ Potassii bromidi,	gr. xv vel xx.
Chloralis hydrat.,	gr. x.
Aquæ camphoræ,	f℥j.
Syr. lactucarii,	f℥j.

M. Sig.: Pro dosi. For nervous headache with insomnia.

The sedative and antispasmodic effects are increased by combination with gelsemium, asafœtida, or valerian, and smaller doses are required than when each agent is administered alone. In the affections of the genito-urinary organs, the bromides are of especial value when spasm or pain is present. The quantity of urine is increased and also the proportion of urea. The sexual functions are depressed; and the bromides are largely used as **anaphrodisiacs** in priapism and nymphomania, especially when given in conjunction with tartar emetic in minute doses.

A good formula used by the author for gonorrhœa with chordee is the following:—

℞ Potassii bicarb., ... ʒiij.
Potassii bromidi, ... ʒiv.
Tincturæ hyoscyami, ... f℥j.
Spiritus chloroformi, ... fʒiv.
Inf. buchu, ... ad f℥viij.

M. Sig.: A tablespoonful in barley-water every three or four hours. This combination relieves scalding and chordee.

The following are also valuable prescriptions containing the bromides:—

℞ Sodii bromidi, ... ʒvij.
Antimonii et potassii tart., ... gr. ss.
Aquæ camphoræ,
Spiritus ætheris nitrosi, ... āā f℥iss.
Syrupi aurantii, ... f℥ij.

M. Sig.: Two teaspoonfuls in water every two or three hours until relieved. Serviceable in epididymitis, cystitis, and prostatitis.

℞ Ammonii bromidi,
Saloli, ... āā ʒj.

M. et ft. capsulæ no. xij.

Sig.: Two capsules every hour or two. Employ in gonorrhœa and all irritable conditions of the genito-urinary organs.

The menses are delayed and rendered less in quantity by the use of the bromides. When menorrhagia is caused by ovarian congestion the bromide of potassium restrains the flow, and the same agent sometimes proves of service in metrorrhagia. In the profuse and irregular menstrual discharges, which often occur as the menopause is neared, the same remedy is of value. The headaches, flushing of the face, subjective sensations of heat, and other anomalous symptoms which characterize the same period, receive notable relief from the bromides. Chordee occasionally yields to the same agent. In spermatorrhœa and atonic impotence, dependent upon irritation or subacute chronic inflammation of the deep urethra, the bromide is valuable by diminishing the reflex irritability of the genital centre in the cord. But in diurnal pollution due to debility of the genital centre, this remedy is harmful and should be avoided. In all cases of reflex nervous disorders having origin in ovarian irritation, the bromides have a well-established reputation, but should not be given freely in anæmic subjects. In uterine cough, stomach-cough, ear-cough, etc., we may give:—

℞ Potassii bromidi, ... gr. v vel x.
Syr. pruni Virg., ... fʒij.

M. Take every four to six hours. The above is also useful in the cough of children.

When it is desired, in laryngology, to make an examination or an operation upon a very sensitive throat, the use, for a few days, of full doses of potassium bromide will greatly assist in reducing such hyperæsthesia. In various hysterical throat affections, the bromides are of the greatest value.

In irritability of the bladder in women who use sewing-machines, or others, the following is serviceable:—

℞ Potassii vel sodii bromidi, ... gr. xx.
Infus. uvæ ursi, ... f℥j.

M. Sig.: Take every hour or two until relieved.

In migraine the combination with opium is valuable:—

℞ Tr. opii deodorat., ... f℥j.
Potassii bromid., ... ℥ii–iiss.
Acid. hydrobromic. dilut., ... f℥ij.
Syr. aurantii flor., ... q. s. ad f℥iv.

M. Sig.: Take a dessertspoonful in water every two or three hours.

Cases of maniacal excitement, puerperal, alcoholic, or other, are relieved by full doses of bromides. Many acute attacks of fever in children, with delirium, are promptly cured by bromides in small doses given every few minutes. Sea-sickness and the vomiting of pregnancy are controlled by small doses of bromides in effervescent salt; large doses have occasioned temporary derangement of mind, and have brought this remedy into disrepute because improperly used. In poisoning by strychnine and in tetanus large doses of the bromides have proven successful in subduing the convulsions.

In acute cerebral congestion, the bromide of potassium is of great value through its influence upon the vasomotor system. It is very serviceable given in conjunction with the fluid extract of ergot, which aids its action by constringing the cerebral vessels. The headache and wakefulness are also relieved by the bromide. The same drug is efficacious in allaying cerebral vomiting. Insomnia, caused by nervous strain or excessive mental application, is successfully treated by means of the bromide. The headache of pachymeningitis is generally best controlled by a combination of the bromide and iodide of potassium, as—

℞ Potassii iodidi, ... ℥iiss.
Potass. bromidi, ... ℥v.
Syrupi aurantii,
Syrupi simplicis, ... āā f℥ij

M. Sig.: Dose, two teaspoonfuls three or four times daily.

In exophthalmic goitre, the excessive cardiac action may often be restrained by the bromide. This remedy may be useful in subacute and acute rheumatism, especially when the acute form of the disease is

accompanied by considerable fever and delirium. The restlessness and delirium of the third week of typhoid fever is often admirably controlled by a bromide. The same agent is very efficacious in preventing the night terrors of children. It is claimed that the bromide of potassium is useful in diabetes mellitus of nervous origin. This salt relaxes nervous spasm of the œsophagus and allays the nervous symptoms of rachitis. The bromide and iodide of potassium are recommended in eliminating metals, as mercury, copper, or lead, from the system. The bromide may be useful in reducing enlarged lymphatic glands and spleen, though far inferior to the iodide of potassium. A bromide increases the effect of hypnotic or narcotic medicines, and it is often able to obviate the unpleasant consequences of opium.

During administration of the bromides, the digestive functions may become disordered and it is necessary to occasionally give cholagogue cathartics to keep the liver up to its work.

In comparing the bromides we observe some difference in their effect and therapeutic applications.

Potassium bromide is the most frequently prescribed, and is the most efficient. Where the circulation is weak the other salts, especially the ammonium salt, are to be preferred.

Sodium bromide is the least toxic, and is preferred in cases where nutrition is poor, especially in anæmic women and children. It is not so efficient in cases of a uric-acid diathesis or lithæmia, as other salts, and notably that of lithia. Ammonium bromide combines the stimulating action of the ammonia with the hypnotic effect of bromine, and it is useful in cerebral rheumatism.

Nickel bromide, introduced by Da Costa for the treatment of epilepsy, has the advantage of the smallness of the dose, but the disadvantage of the metallic poisoning when too long continued. It is best given in effervescent salt. Zinc bromide is little used; it is supposed to combine the well-known action of zinc upon the central nervous system with the bromide action. The syrup of bromide of iron has been employed for chorea in anæmic children, with good results.

Bromoform—Tribromo-Methane.—If to methane, or marsh-gas (CH_4), be added 3 atoms of bromine in substitution for 3 of hydrogen, we get bromide of methyl, or bromoform ($CHBr_3$), analogous, therefore, in composition to chloroform or iodoform. Bromoform is an oily liquid, having an agreeable odor resembling that of chloroform. Its density is 2.77 and it boils at 150° C. Insoluble in water, it dissolves in alcohol and ether, its reactions being similar to chloroform. It usually is present in small proportion in commercial bromine, and is made by adding bromine to a solution of an alkaline hydrate in alcohol or wood-spirit.

Bromoform was first introduced by Stepp, of Neurenberg, in 1889, as a valuable remedy in whooping-cough. A series of one hundred cases was reported by himself, and his experience was subsequently confirmed by Löwenthal * in the polyclinic of Professor Senator, of Berlin, by Neumann, Schippers, and other observers. In children aged from six months to one year, 2 minims may be given three or four times daily, and the dose is increased by about a drop for every additional year of age. The dose for adults is 0.5 to 0.8 gramme in capsules. Bromoform diminishes the frequency, severity, and duration of the paroxysms of pertussis, has a favorable influence upon the mucous secretion, and generally abolishes vomiting and the hæmorrhages within a short period. The most severe cases are perceptibly benefited within eight days. Dr. S. Solis Cohen has used bromoform with beneficial results, as a local application, in the treatment of tuberculous and other ulcers of the throat. He recommends its combination with iodoform. Two cases of poisoning from bromoform have been reported, the patient in each case being a child who had taken a large quantity of the pure drug. Extreme collapse was the result, but both patients made good recoveries, under the use of restoratives. A fatal case was observed by Nauwelaers, the patient being a child fifteen months of age. The symptoms were: profound depression of circulation and respiration, muscular relaxation, coldness, stupor, fixed and contracted pupils. There were found slight congestion of the brain, marked injection of the stomach and duodenum, and a great increase of the bronchial secretion.

BUCHU (U. S. P.).—**Buchu.**

Preparations.

Extractum Buchu Fluidum (U. S. P.).—Fluid Extract of Buchu. *Dose*, ♏x–f ʒj.
Infusum Buchu.—Infusion of Buchu. *Dose*, f ℥ij.

Pharmacology.—The leaves of Barosma betulina, B. crenulata, and B. serratifolia (Rutaceæ),—the latter constituting "long" buchu, the first two "short" buchu,—derived from Southern Africa. They contain a volatile oil, which is the most active constituent, and is present in greater proportion in the short than in the long buchu. They also contain mucilage. A camphoraceous substance, barosma camphor, is deposited from the oil, in the cold. The recent infusion is made in the strength of one ounce to the pint. The fluid extract is made with dilute alcohol (alcohol, 2 parts; water, 1 part) and does not mix readily with water, on account of the presence of the oil and extractives. The dose of the fluid extract is one-half to one fluidrachm; of the infusion, one-half to two fluidounces.

* See contribution by author on some "New Methods in Whooping-Cough," in Medical Bulletin, December, 1890.

Physiological Action.—Buchu leaves have a strong, mint-like odor and a bitter, pungent taste. When taken into the stomach a warming, carminative effect is produced by small doses, but very large ones cause irritation. The volatile oil diffuses into the blood, slightly stimulating the circulation, and especially acting upon the kidneys, increasing the quantity of the urine (both fluid and solid constituents being increased), and imparting to it a peculiar, aromatic odor. In process of excretion the remedy acts as an astringent and disinfectant upon the urinary organs, especially the bladder. As a portion is eliminated by the bronchial mucous membrane, a stimulating influence is also exerted here in relaxed conditions accompanied by increased secretions. When used to excess or for a long period, the kidneys suffer and degenerative or inflammatory conditions are initiated.

Therapy.—The principal use of this agent is for disorders of catarrhal character affecting mucous membranes and diseases of the genito-urinary organs particularly. In incontinence of urine, or want of tone in the bladder, good results follow its administration. Through the enterprise of the owners of proprietary remedies, buchu has a popular reputation for the cure of gonorrhœa, but, owing to the quantity of alcohol contained in the fluid extract, it is not to be used during the existence of inflammation, and only with great care in chronic urethritis or gleet.

There are many good reasons for believing that the much-advertised "buchu cures" for gonorrhœa contain no buchu-leaves whatever, but are made from the leaves of uva ursi and other domestic plants. In fact, buchu resembles oil of turpentine very much in its physiological effects and is useful in much the same class of cases. In gleet and chronic catarrh of the bladder unattended by kidney disease, buchu is highly serviceable.

CACTUS.—Cactus. (Night-blooming Cereus.)

Pharmacology and Therapy.—The Cereus grandifloris (Cactaceæ) is a plant of Mexico, with large, showy, nocturnal-blooming flowers, of pearl-white petals, which have a heavy perfume. A tincture of the fresh stems and flowers (℥iv–Oj alcohol) is claimed by Rubini to be a valuable cardiac tonic in doses of ♏i–v, three times a day. Probably these doses might be much increased, as Kunge gave ♏xx at once, and H. C. Wood was unable to perceive any effect from them at all. A difference might be accounted for on the ground that some use the fresh plant and others the flowers and leaves recently dried, the latter being the stronger preparation. Gregory claims that cactus increases the contractile power of the heart-muscle, regulates its rhythm, and improves its nutrition. It is claimed to be free from the unpleasant effect of digitalis. Boinet and

Boy-Teissier determined that in frogs cactus increases cardiac energy, but that the effect is transitory. Dr. Reynold W. Wilcox states that the physiological action of cactus is upon the intra-cardiac ganglia and accelerator nerves, through the cardiac plexus of the sympathetic system, and that there is no interference with the inhibitory nerves, nor does its administration produce any very marked vasomotor changes. It shortens the ventricular systole and increases the blood-pressure. Sultan has extracted an active principle, which he terms cactin, from the young flowers of the plant. He states that cactin increases the energy of the cardiac contractions, heightens arterial tension, and has a direct action upon the motor centres of the spinal cord. It produces reflexes, increases the general nervous tone, and can be used for a long period without causing gastric symptoms or cumulative effects. Dr. Wilcox found it especially useful in uncompensated cases of valvular disease, in relative incompetency due to muscular degeneration, in weak hearts after typhoid fever, in functional heart diseases from alcohol, dyspepsia, sexual exhaustion, etc., and in the palpitation of exophthalmic goitre. In aortic regurgitation he considers it to be the drug, *par excellence*, while in mitral stenosis it should be avoided.

CADMIUM.—Cadmium.

Preparations.

Cadmii Sulphas.—Sulphate of Cadmium. Local use.

Cadmii Iodidi.—Iodide of Cadmium (containing about 70 per cent. of iodide).

Cadmii Iodidi Unguentum.—Ointment of the Iodide of Cadmium (ʒi–℥j lard). Does not discolor the skin.

Cadmii Oleas.—Oleate of Cadmium. See Oleates.

Cadmium is usually found combined with zinc in the ores. It resembles tin in general appearance, and its salts are white and permanent; they are soluble in water. They are astringent, and resemble the corresponding zinc salts, producing emesis, but they are principally employed for their local effects. The ointment of the iodide, or the oleate, may be used in chronic enlargement of glands or joints, and especially in goitre. The sulphate may be employed as an astringent wash (in solutions gr. ii–℥j), or as an ointment (1–40 benzoinated lard).

CAFFEINA (U. S. P.).—**Caffeine.** See also Coffea.
Dose, gr. ii–x.

Preparations.

Caffeinæ Citras.—Citrate of Caffeine. *Dose*, gr. i–v.

Caffeinæ Sodio-Benzoas.—Sodio-Benzoate of Caffeine. *Dose*, gr. ii–x.

Caffeinæ Sodio-Salicylas.—Sodio-Salicylate of Caffeine. *Dose*, gr. ii–x.

Pharmacology.—Caffeine is a proximate principle of feebly-alkaloidal power, generally prepared from the dried leaves of Camellia thea (Tern-

stromiaceæ), or from the dried seeds of Caffea Arabica (Rubiaceæ), or of Guarana or Paullinia sorbilis (Sapindaceæ), and occurring also in other plants. Paraguay tea, or maté, the dried leaves of the Brazilian holly (Ilex Paraguensis), also contains caffeine, and is largely used as a hot beverage and stimulant in South America. It exists also in the kola-nut of Africa, the fruit of Sterculia acuminata (Sterculiaceæ). It is closely related to theobromine, existing in theobroma cacao, and to cocaine, found in erythroxylon coca, both in chemical composition and effects upon the human body.

The citrate of caffeine is most frequently employed in medicine on account of its greater solubility, but Tanret has recently shown that by the addition of an equal weight of salicylate or benzoate of sodium the solubility of caffeine is greatly increased. Antipyrin has also been found to have the same action; so that by this means the hypodermic administration is greatly facilitated. Twenty-four grains of antipyrin will enable 15 grains of caffeine to dissolve in 1 ounce of distilled water, with the aid of heat, forming a permanently limpid solution.

Caffeine is in the form of colorless, silky, inodorless crystals, sparingly soluble in alcohol and cold water (75 parts), but much more soluble in boiling water (9.5 parts). It is precipitated from its aqueous solution by tannic acid, or solution of iodide of potassium and mercury; with the latter reagent the deposit is crystalline, whereas, with other alkaloids, the product is always amorphous when this test is employed. Caffeine was first extracted from coffee in 1821, by Pelletier and Caventou, and by Robiquet and Runge. According to Wurtz, it exists in coffee, tea, maté, and guarana, and chemically is methyl-theobromine (or trimethyl-xanthine). The caffeine of commerce is usually made from damaged tea.

Physiological Action.—Recently, it has been claimed by Dr. Mays that the physiological effects of the alkaloid obtained from coffee differ from those following the administration of caffeine from tea. It has been held that the well-known differences in the physiological effects of tea and coffee were due to other constituents, and especially to volatile oils, and in the ordinary method of manufacture these might still contaminate the caffeine. Recently, it has been shown that Camellia thea contains another base, theophylline (Rossel, *Zeitschrift für Physiologische Chemie*), isomeric, but not identical with theobromine and paraxanthine. The presence of this base might also affect the physiological results. Mays claims that theine possesses analgesic properties which are absent in caffeine; and that the latter will not affect the heart, while the former causes palpitation. Theine, injected hypodermically, produces local anæsthesia, whereas pure caffeine will not affect sensibility. Tanret and

Fauvel, on the contrary, regard caffeine as an efficient local anæsthetic. Investigations with ordinary caffeine (theine) prove it to have very decided physiological powers. There is, after its administration, at first increase, but later diminution, of the activity of the reflex centres of the spinal cord. In frogs, convulsions and muscular rigidity are caused; the heart's action is at first accelerated and afterward slowed. Arterial pressure at first rises, but subsequently falls. It has a decided diuretic action. The excretion of urea is at first increased, afterward diminished. Administered medicinally, the rate of respiration is reduced, blood-pressure lowered; temperature slightly increased, afterward diminished. The cerebral functions are stimulated, and, in some persons, wakefulness results. It counteracts the effects of narcotic remedies, and is valuable in the treatment of opium poisoning, although not a complete antidote. When taken into the stomach, caffeine diffuses readily into the blood, and is eliminated by the kidneys and the liver, principally. Small doses increase the appetite and facilitate digestion; there is some irritation of the digestive tract, increasing peristalsis and in some cases causing venous congestion and hæmorrhoids. From a dose of 12 grains of caffeine, Dr. Pratt experienced restlessness, sleeplessness, mental depression, and tremor. A dessertspoonful of the citrate produced nausea, stupor, extreme pallor and debility, soft pulse, slow and sighing respiration; but recovery followed the use of emetics, hot applications, and brandy.

Therapy.—In migraine, caffeine citrate may be administered, 1 grain every hour, with excellent effect; or a cup of strong tea or coffee given. Where there is co-existing liver, kidney, or stomach disorder, this should also receive attention. Hemicrania may be relieved by the administration of caffeine, and the hypodermatic injection of this agent is sometimes efficient in neuralgia; or, it may be administered as follows:—

℞ Caffeinæ citras, ... gr. xx.
Phenacetin.,
Pulv. aromatic., ... āā ʒss.
M. et ft. chartæ no x.

Sig.: A powder every two or three hours. Serviceable in migraine, and in neuralgia about the scalp, face, and in sciatica.

℞ Caffeinæ citras, ... gr. xx.
Acetanilid., ... gr. l.
Ext. cannabis Indicæ, ... gr. iij.
M. et ft. capsulæ no. x.
Sig.: A capsule every two or three hours for neuralgia.

℞ Caffeinæ citrat., ... ʒss.
Ammonii bromidi, ... ʒiij.
Elix. guaranæ, ... f℥ij.
M. Sig.: A teaspoonful every hour or two until relieved of pain of neuralgia.

In despondency and hypochondriasis it will sometimes serve a good purpose. It may be given in order to dissipate the drowsiness which is often produced by a hearty dinner.

As a cardiac stimulant in valvular disease, dilated or fatty heart, or in the myocarditis accompanying rheumatism, in low fevers, and in dropsy due to weak heart, caffeine may be given hypodermatically (gr. i–ij every two to four hours), or the sodio-benzoate may be employed as recommended by Huchard. In chronic Bright's disease it diminishes albuminuria and dropsy. It may be used in co-operation with hydragogue cathartics in ascites. Uræmic coma may sometimes be lightened by the hypodermatic administration of caffeine. It may be used during the intervals of administration of digitalis, or, where this drug is too slow, given in the following combinations:—

℞ Caffeinæ citratis,		gr. l.
Liquor. potassii citratis,		
Spiritus ætheris nitrosi,		
Infus. digitalis,	āā	f℥ij.

M. Sig.: A half a tablespoonful in water every three or four hours. Employ in valvular insufficiency, attended with dropsy.

In weak, dilated heart, with gouty tendency, and in nephritis, the following are useful:—

℞ Caffeinæ citratis,		
Lithii citratis,	āā	gr. c.
Strychninæ sulphat.,		gr. ¼.
Ol. gaultheriæ,		♏v.

M. et ft. capsulæ no. xx.
Sig.: One every four hours.

℞ Caffeinæ citrat.,	gr. l.
Tinct. strophanthi,	♏lxx.
Aquæ camphoræ,	f℥iij.

M. Sig.: A teaspoonful three times a day. Use in parenchymatous nephritis attended with dropsy.

In pneumonia, or congestion of the lungs with weak heart, in elderly patients, caffeine is an excellent remedy in moderate doses (gr. i–ij, given every two to four hours). It is likewise of value in the weakened heart of typhoid fever and pneumonia, after the febrile stage has passed. In the diarrhœa of relaxation, typhoid fever, sporadic cholera, etc., the sodio-benzoate or sodio-salicylate may be used in combination with nux vomica or strychnine.

Cholera infantum and the diarrhœa of phthisis are not infrequently benefited by caffeine. An asthmatic paroxysm may often be relieved by this remedy.

CAJUPUTI OLEUM (U. S. P.).—**Oil of Cajuput.**

Dose, ♏i–v.

Pharmacology.—The volatile oil of cajuput is of a green color, and has a camphoraceous odor and neutral reaction. It is distilled from the leaves of Melaleuca cajuputi (Myrtaceæ), a tree of the Moluccas.

Physiological Action.—Locally it is rubefacient, antispasmodic, and antiseptic. It may also serviceably enter into the composition of a stimulating ointment for alopecia. This oil has been successfully used, suitably diluted with an emulsion, as an injection for ascarides or seat-worms. Internally it is carminative, diaphoretic and diuretic, and somewhat stimulating to the circulation.

Therapy.—Externally it has been used as a counter-irritant, usually diluted with sweet-oil, in myalgia and chilbains, and in various parasitic affections, such as tinea, pityriasis, eczema, scabies, etc. The oil of cajuput has been used with advantage to relieve the prostration of typhoid fever. This remedy is of service in intestinal colic, cholera morbus, and nervous vomiting, and it is said to allay the pain of dysmenorrhœa. Its principal use internally is for its stomachic effects as an adjuvant to tonic remedies. It has been administered in comparatively larger doses (♏xv–lx) in the collapse stage of cholera, with good results. It is claimed to be useful in rheumatism and in various skin diseases.

CALAMUS (U. S. P.).—**Calamus, Sweet Flag.**

Preparation.

Extractum Calami Fluidum (U. S. P.).—Fluid Extract of Calamus. *Dose*, ♏xv–f℥j.

Pharmacology.—The scraped and dried rhizome of Acorus calamus (Araceæ) is slightly aromatic and quite pungent to the taste, and is carminative. It contains **Acorin,** a nitrogenous principle, a volatile oil, benzoic acid, etc.

Therapy.—In consequence of its feebly-aromatic taste, calamus is sometimes useful in overcoming a tendency to flatulence, by chewing it slowly and swallowing the saliva. It is used also as a substitute for tobacco by those accustomed to chewing the weed. It is a constituent in various "bitters" used as appetizers and stimulants. An infusion (℥i–Oj) may be administered in wineglassful doses as a stomachic tonic.

CALCIUM.—**Calcium.**

Officinal Salts.

Calx (U. S. P.).—Quicklime. Not used internally.

Calx Chlorata (U. S. P.).—Chlorinated Lime (available chlorine, 25 per cent.).

Calx Sulphurata (U. S. P.).—A mixture of Sulphide and Sulphate of Calcium, containing not less than 36 per cent. of absolute sulphide of calcium. *Dose*, gr. ¼–ij.

Calcii Chloridum (U. S. P.).—Chloride of Lime. *Dose*, gr. i–xx.

Calcii Hypophosphis (U. S. P.).—Hypophosphite of Lime. *Dose*, gr. x–xx.

Calcii Bromidum (U. S. P.).—Bromide of Calcium. *Dose*, gr. x–xxx.

Calcii Carbonas Precipitatus (U. S. P.).—Precipitated Carbonate of Calcium. *Dose*, gr. x–xl.

Calcii Phosphas Precipitatus (U. S. P.).—Precipitated Phosphate of Calcium. *Dose*, gr. x–xxx.

Creta Preparata (U. S. P.).—Prepared Chalk. *Dose*, gr. x–xx.

Preparations.

Syrupus Calcii Lactophosphatis (U. S. P.).—Syrup of Lactophosphate of Lime (gr. x–℥j). *Dose*, f℈i–ij.

Syrupus Calcis (U. S. P.).—Syrup of Lime (calcium hydrate, 5 per cent.). *Dose*, f℈ss–j.

Syrupus Hypophosphitum (U. S. P.).—Syrup of the Hypophosphites (lime, gr. iij; potassium, gr. j; sodium, gr. j; in f℈j). *Dose*, f℈ss–ij.

Syrupus Hypophosphitum cum Ferro (U. S. P.).—Syrup of the Hypophosphites with Iron (1 per cent. lactate of iron). *Dose*, f℈i–ij.

Hydrargyrum cum Creta (U. S. P.).—Mercury with Chalk (mercury 38, chalk 50, milk-sugar 18 parts). *Dose*, gr. i–xx.

Trochisci Cretæ (U. S. P.).—Chalk Lozenges (prepared chalk, 4 grs. each). *Dose*, 1 or more.

Pulvis Cretæ Compositus (U. S. P.).—Prepared Chalk-Powder (prepared chalk 30, acacia 20, sugar 50 parts). *Dose*, gr. v–xxx.

Mistura Cretæ (U. S. P.).—Chalk Mixture (compound chalk-powder 30, cinnamon-water and water āā 40 parts). *Dose*, f℈i–iv.

Liquor Calcis (U. S. P.).—Lime-Water (contains about 15 per cent. calcium hydrate). *Dose*, f℥ss–ij.

Linimentum Calcis (U. S. P.).—Lime Liniment (equal parts lime-water and cotton-seed-oil.

Potassa cum Calce (U. S. P.).—Vienna or Caustic Paste (equal parts caustic potassa and lime).

Testa Preparata.—Prepared Oyster-Shell. *Dose*, gr. v–xx.

Liquor Calcis Chloratæ.—Solution of Chlorinated Lime (13 grains of available chlorine in each ounce). A disinfectant.

Lotio Hydrargyri Nigra.—Black Wash (calomel, gr. xxx; lime-water, f℥x).

Lotio Hydrargyri Flava.—Yellow Wash (corrosive sublimate, gr. xviij; lime-water, f℥x).

Pulvis Cretæ Aromaticus cum Opio.—A mixture of Aromatics with Chalk, containing 1 grain of opium in 40). *Dose*, gr. x–xx.

Calcii Carbolas.—Carbolate of Lime. Used as a disinfectant.

Pharmacology.—Lime is the oxide of a metallic element, calcium, which, like potassium and sodium, decomposes water at ordinary temperatures. Calcium oxide, when fresh from the lime-kilns, is in large, hard, grayish masses, constituting what is known as quicklime, which has a great affinity for water, even taking it from the air. Under the influence of moisture, lime generates heat and breaks up into a wet powder, which is a mixture of calcium oxide and calcium carbonates, and constitutes slaked lime. Calcium oxide is more soluble in cold than in hot water. Chalk, or calcium carbonate, is a valuable antidote in cases

of poisoning by carbolic, sulphuric, or oxalic acids. It is found in the household in tooth-powder, convenient for prompt administration.

Physiological Action.—Some preparations of lime are sedative, others astringent or caustic; quicklime is irritating and caustic to mucous membranes. Lime-water and chalk are astringent and alkaline; they reduce the acidity of the contents of the alimentary canal, thus relieving irritation, and also exert a slightly astringent effect. In patients suffering from deficiency of lime in the food, lime-water is a useful and acceptable remedy, and may be continued for a long time. The chloride of calcium is more of an irritant; it has a reputation for its influence as an alterative in strumous patients. Vienna paste is used in surgery as a caustic.

Therapy.—Lime is an ingredient in depilatory powders, which are now superseded by the process of removal of hair by electrolysis. Freshly-slaked lime absorbs the products of decomposition, and is used as a disinfectant in cess-pools, manure-heaps, etc.; but the chlorinated lime, which prevents decomposition by virtue of the available chlorine, is far better. Lime-water is a stimulating dressing for wounds and ulcers, and, combined with oil, is used as a dressing for burns. Carron-oil consists of linseed-oil and lime-water, but the pharmacopœia directs cotton-seed-oil instead, which is cleaner. A better dressing is made by beating up lard (unsalted) with lime-water and adding a few drops of oil of bitter almonds. A very good prescription to use in burns will be:—

℞ Calcis præcip., ... ʒj.
Acidi carbolici, ... ℥ss.
Ol. olivæ,
Aquæ calcis . . . . āā f℥v.—M.

Lime-water is of undoubted value alone, or combined with glycerin, in the treatment of acute vesicular eczema. It may be employed for this as well as other varieties of eczema, especially when the surface is dry and irritable, with very great relief. Pruritus, which often becomes intolerable in eczema and other inflammatory affections of the skin, and itching present in old persons, may be relieved or cured by the application of lime-water, with rose-water, glycerin, or one of the oils. A very suitable application in the diseases just referred to is:—

℞ Liquor. calcis, ... f℥iij.
Creasoti, ... ♏x.
Pulveris zinci carb. (impur.), ... ℥j.
Glycerini vel ol. olivæ, ... f℥iij.
M. Sig.: Shake well and mop over the surface.

In seborrhœa, hyperidrosis, bromidrosis, and in bruises of the skin and deeper structures, the preparations of calcium, especially lime water,

are often used with great benefit. The following are excellent combinations:—

℞ Calcis præcip., ... ℥j.
Liq. boroglyceridæ (50 per cent.), ... f℥ss.
M. Sig.: Smear over the parts bruised.

℞ Calcii chloridi,
Calcis præcip.,
Pulv. amyli,. . . . . āā ℥j.
M. Sig.: Dust over the surface, especially in oily conditions of the skin and in excessive and fetid perspiration.

Prepared chalk is employed very largely, alone as well as an ingredient of many very good dentifrices, on account of its antacid, astringent, and sedative action upon the gums and the mucous membrane of the buccal cavity. Garretson recommends the appended formula as being a good tooth-powder:—

℞ Cretæ prepar.,
Pulv. iridis flor., ... āā ℥ss.
Pulv. ossis sepiæ, ... ʒij
Olei limonis, ... q. s.—M.

The preparations of calcium are especially useful in childhood because of the deficiency of lime in the food of many children. Lime-water added to milk gives material for bones and teeth, improves nutrition, and overcomes a tendency to rickets. It relieves irritability of the stomach and vomiting.

The syrup of lime contains more of the base than the solution, and is a convenient antidote to poisoning by oxalic, sulphuric, and other mineral acids. In children's diarrhœa, often due to sour stomach, chalk mixture is very useful, and may be combined with an antiseptic and opiate:—

℞ Creasoti, ... ♏iv.
Tinct. opii camph., ... fʒj.
Mist. cretæ, ... q. s. ad f℥ij.
M. Sig.: A teaspoonful every two hours in a child two years old.

The same mixture is useful in adults, with corresponding increase of dose and the addition of a decided astringent, such as tincture of kino, or fluid extract of coto-bark.

Other very effective prescriptions containing lime are:—

℞ Calcii carbonas precipitati, ... ʒiij.
Tincturæ catechu, ... f℥j.
Tincturæ opii, ... fʒij.
Spiritus chloroformi, ... fʒiv.
Pulveris acaciæ, ... ʒij.
Aquæ menth. pip., ... f℥viss.
M. Sig.: One or two teaspoonfuls in water every hour or two, for acute diarrhœa.

℞ Liquor. calcis,
Ext. coto corticis fl.,
Syrup. acaciæ, ... āā f℥j.

M. Sig.: From one to two teaspoonfuls in water or milk every three or four hours, for chronic diarrhœa.

Special Applications.—In very young children, lime-water alone is sufficient, where the motions are too frequent and watery, and acid in their reaction. It is also used per enema against thread-worms, and it may be given as an injection in leucorrhœa. In diphtheria, much relief is experienced from the use of a spray of lime-water, preferably with the steam-atomizer, directed to the fauces, or from inhaling the vapors from slaking lime; it is claimed that the lime loosens the false membrane and partially dissolves it. It is also useful in the same manner in croup and plastic bronchitis. In adults, where it is desirable to administer milk, it is often found necessary to add lime-water to it to prevent curdling. Milk and lime-water will not infrequently relieve gastralgia, and even, in some instances, the pain of gastric carcinoma. In the latter affection it also allays the vomiting. The prolonged administration of lime-water renders the urine alkaline, and hence it may prove useful in lithiasis. In combination with opium and aromatics, as in the pulvis cretæ aromaticus cum opio of the British Pharmacopœia, chalk is of great value in diarrhœa. The carbonate of calcium is likewise beneficial in diarrhœa, and, finely powdered, is a good application in intertrigo and acute eczema. The phosphate of lime is useful in rickets; also in anæmia, general debility, diarrhœa, in small doses, given frequenly; it appears to have a stimulating effect upon the liver, and should be given in preference to mercury to infants with clay-colored stools, and in jaundice. The anæmia due to profuse suppuration, or to lactation, may be remedied by the administration of this salt. It is advantageous, moreover, in mollities ossium, delayed union of fractured bone, caries and necrosis, and scrofulous inflammation of the lymphatic glands.

Calx sulphurata is useful in styes, acne, and furuncles; given in gr. $\frac{1}{4}$–$\frac{1}{2}$ doses several times a day, it hastens maturation of pustules. If given early, it prevents the formation of pus, but if suppuration has occurred the sulphide of calcium limits its extent and favors early and complete evacuation. This combination is serviceable in both acute and chronic eczema. It is likewise beneficial in the suppuration of scrofulous glands. It is given with good effects in ophthalmia and sores in scrofulous children. Calx sulphurata is the officinal equivalent of sulphide of calcium.

Chloride of calcium (not calx chlorata) is given, well diluted, in glandular enlargements, and is said to be curative in eczema and lupus;

it is claimed that it aids cicatrization in tubercular ulcerations, and is useful in chorea and colliquative diarrhœas in strumous children. The hypophosphite of lime has a special reputation for the treatment of phthisis, and is a useful tonic in such cases. The compound syrup of the hypophosphites with iron or strychnine, in appropriate cases, is one of the best general systemic tonics that we possess, especially when prescribed as follows:—

℞ Syrup. hypophosphitum comp.,	f℥iv.
Syrup. ferri lactatis,	f℥iv.
Strychninæ sulphatis,	gr. ¼.

M. Sig.: A half-tablespoonful in water three times a day.

The bromide of calcium was brought forward (by Hammond) as a substitute for the potassium salt in cases where the depressing effects of the latter would forbid its use, such as epilepsy or chorea, in anæmic subjects (in doses of f℥ss–ij), but it is seldom used. Hugh Woods prefers the calcium oxyiodides to the other iodine preparations, as containing more iodine. The syrup of the lactophosphate of lime (made by dissolving phosphate of lime in lactic acid, with orange-flower water and syrup) is a pleasant and very useful remedy for improving nutrition in young children, especially if there be a scrofulous taint. It contains about 12 grains of lime phosphate in each ounce. It is also a valuable agent in treating many skin diseases due to malnutrition. This combination may be advantageously prescribed, in vesicular emphysema, chronic bronchitis, phthisis, debility, and wasting diseases, thus:—

℞ Syrup. calcis lactophosphatis,	f℥iij.
Olei gaultheriæ,	♏xxx.
Pulveris acaciæ,	ℨj.
Liquor. pancreatici,	f℥j.
Olei morrhuæ,	f℥v.

M. et ft. emulsio.
Sig.: A tablespoonful three times a day.

Dr. H. V. Knaggs ascribes valuable antispasmodic properties to calcium sulphite, in spasmodic diseases. He gives gr. $\frac{1}{20}$ to a child 1 year old suffering with convulsions from dentition, meningitis, and even acute tuberculosis. A saturated aqueous solution of the bisulphite is an excellent non-poisonous disinfectant. The preparations of chalk, if given in large doses for a considerable period of time, may form intestinal concretions.

CALENDULA (U. S. P.).—Marigold.

Preparation.

Tinctura Calendulæ (U. S. P.).—Tincture of Calendula (20 per cent.). *Dose*, fℨss–j.

Pharmacology and Therapy.—The fresh flowering herb of Calendula officinalis (Compositæ) contains a volatile oil, an amorphous bitter prin-

ciple, **Calendulin,** yellow coloring matter, etc. It is used as an emmenagogue and as a diaphoretic, in recent infusion. In the form of tincture, it is reputed to be tonic, antispasmodic, and alterative, and may be employed locally as a revulsive in sprains, bruises, or in superficial burns and scalds, resembling arnica in its applications, though less active.

CALUMBA (U. S. P.).—**Calumba, Columbo.**
Dose, gr. v–x.

Preparations.

Extractum Calumbæ Fluidum (U. S. P.).—Fluid Extract of Calumba. *Dose,* ♏xv–xxx.
Tinctura Calumbæ (U. S. P.).—Tincture of Calumba. *Dose,* f ʒi–ij.
Extractum Calumbæ.—Extract of Calumba. *Dose,* gr. ss–ij.

Pharmacology.—The root of Jateorrhiza calumba (Menispermaceæ) of Africa contains, among its constituents, berberine, calumbin, calumbic acid, and starch. It is free from tannin, and therefore its preparations may be combined with iron.

Physiological Action and Therapy.—In composition and physiological action, calumba resembles quassia and gentian, though lighter and more agreeable than some of the other remedies of this class, and more acceptable to the stomach. As a bitter tonic, calumba may be used during convalescence, or in atonic dyspepsia or other enfeebled constitutional conditions. It is believed to be somewhat sedative and antispasmodic; in cases where this quality is required it would be better to use the fluid extract or powder than the tincture. A small dose of the tincture or infusion of calumba will often relieve nausea and vomiting. Atonic diarrhœa is benefited by calumba. When prescribed as an appetizer, the danger of forming the alcohol habit should be kept in mind:—

℞ Ext. calumbæ, ...	gr. ij.
Sodii bicarb., ...	gr. x.
Pulv. rhei, ...	gr. v.
Pulv. zingiberis, ...	gr. x.

M. et ft. capsulæ, mitte tales no. xxx.
Sig.: Take one before each solid meal, for weak digestion.

CAMBOGIA (U. S. P.).—**Gamboge.**
Dose, gr. $\frac{1}{10}$–iij.

Pharmacology.—Gamboge is obtained from the Garcinia Hanburii (Guttiferæ), a tree of Siam. It is a gum-resin, consisting largely of gambogic acid (73 per cent.), and is partly soluble in alcohol and ether, and forms an emulsion with water. It has no officinal preparations, and is never administered by itself, but is a constituent of the compound cathartic pill (each pill containing gr. $\frac{1}{4}$ of gamboge).

Physiological Action.—Gamboge is not a systemic but a local irritating purgative. It is at first tasteless, but afterward produces an acrid taste, with increased secretion of saliva. In the intestinal tract, it has a drastic, hydragogue, cathartic effect. It stimulates the intestinal glands, but not the liver (Rutherford), and is also believed to have some power as a diuretic, as it imparts a bright-yellow color to the urine. It carries off the bile in the intestinal canal and prevents re-absorption. Large doses cause vomiting and gastro-enteritis.

Therapy.—Gamboge has no local effect beyond staining the skin. It was formerly used in cardiac dropsy to carry off large quantities of fluid and promote absorption, but the compound jalap-powder accomplishes this result more quickly, agreeably, and certainly. The compound cathartic pill is a good remedy for constipation and at the beginning of the treatment of malarial poisoning. In minute doses (gr. $\frac{1}{10}$ every hour or two) it is claimed that gamboge would afford much relief in flatulence and intestinal indigestion.

CAMELLIA.—Tea.

Preparations.

Extractum Camelliæ Fluidum.—Fluid Extract of Camellia. *Dose,* ♏x–f℥j.
Infusum Camelliæ.—Infusion of Tea (prepared extemporaneously). *Dose,* f℥ii–vj.

Pharmacology.—The extemporaneously-prepared infusion of the dried leaves of Camellia thea (Ternstromeaceæ), or Chinese tea-plant, is now so widely used at the table as a beverage that it has given its name to the evening meal. It contains caffeine (or theine), theophylline (Rossel),* a volatile oil, tannin, etc. Green tea is made from the younger leaves, dried with a moderate heat, so as to retain their color (sometimes fraudulently colored with Prussian blue, turmeric, and copper), while the black tea is made of the older leaves, and contains more tannin.

Physiological Action and Therapy.—The effects of tea are not fully represented by caffeine; probably theophylline, which is isomeric with theobromine, and the volatile oil assist in producing its physiological action upon the system. It is an antidote to narcotic poisoning by virtue of its caffeine, and to antimony and many alkaloids on account of its tannin; it is also a physiological antidote to agents which depress nerve-function or the heart. In small doses (℥i–ij) infused with boiling water, tea is an agreeable stimulant, removing a sense of fatigue and giving a feeling of well-being. It is useful in headache from overwork or worry, and will often relieve migraine. Tea is an accessory food, but, on account of its convenience, it often becomes the principal article of food for persons who think that they cannot spare time to prepare a full meal, or have not the appetite to eat it. In many cases of what has been called tea-drinkers'

* Zeitschrift für Physiologisches Chemie. Therapeutic Gazette, March 15, 1890.

dyspepsia, in sewing-women, it is found, upon inquiry, that the tea is drunk with every meal, and that very little food is taken with it except bread or hot biscuit. Such cases of debility, palpitation of the heart, anæmia, flatulence, anorexia, constipation, etc., are not really instances of "Theism," but cases of starvation, and require good food, sunlight, exercise, and tonics. Men who deal in tea, and constantly taste it, only exceptionally show symptoms of nerve-disorder ascribable to this cause; even then it may be due to idiosyncrasy, for persons have different degrees of susceptibility to the effects of tea. Some cannot use it at all; others are proof, apparently, against any ill effects. Many can drink black tea who cannot stand the effects of green tea.

The fluid extract of tea may be used with good effect in low fevers as a stimulant, and in typhoid pneumonia, in the same class of cases as mentioned under the head of **Caffeine** (see page 493).

CAMPHORA (U. S. P.).—**Camphor.**
Dose, gr. i–ij.

Preparations.

Oleum Camphoræ.—Oil of Camphor. *Dose,* ♏i–iij.

Aqua Camphoræ (U. S. P.).—Camphor-Water (gr. iv–f℥j). *Dose,* f℥i–iv.

Spiritus Camphoræ (U. S. P.).—Spirit of Camphor (10 per cent.). *Dose,* ♏v–xx.

Linimentum Camphoræ (U. S. P.).—Liniment of Camphor (camphor 20, cottonseed-oil 80 parts). External use.

Ceratum Camphoræ (U. S. P.).—Camphor Cerate (3 per cent.).

Camphora Monobromata (U. S. P.).—Monobromated Camphor. *Dose,* gr. i–v.

Camphor is also a constituent of soap-liniment, camphorated tincture of opium, liniment of belladonna, compound mustard-liniment, chloroform mixture, and of compound morphine-powder.

Pharmacology.—The camphor-tree, Cinnamomum camphora (Lauraceæ), is a native of the East Indies and China; it contains a solid, volatile, fatty substance, or stearopten, which exists in all parts of the plant or crystallizes naturally in the wood and under the bark. As collected by natives, it is called crude camphor, which is purified in this country by sublimation. Camphor is in white, translucent, partly-crystalline masses, of penetrating, aromatic odor and a cool, acrid taste. It is lighter than water, in which it is very sparingly soluble, but is readily dissolved by alcohol and ethereal substances. Camphor is quite soluble in milk, which may often, therefore, be used as a convenient vehicle. It is easily ignited and burns with a smoky flame. With chloral hydrate, camphor combines when triturated (equal parts), forming an oily liquid. When three parts of camphor are rubbed with one part of crystallized carbolic acid, a clear liquid is formed. Camphor cannot be powdered by trituration alone, but can be when moistened with alcohol, chloroform, or ether.

Physiological Action.—When applied to the skin, camphor slightly irritates and reddens the surface, and probably diffuses through into the deeper structures, so as to exert a local sedative effect. In considerable doses, camphor causes vertigo and confusion of ideas, diaphoresis, delirium or stupor, followed by epileptiform convulsions and maniacal excitement. There is lowering of the reflex excitability of the spinal cord and muscular weakness. Upon the circulation a stimulating effect is observed from small doses and the arterial tension is raised, but larger doses cause prostration and weakness of the heart's action. Camphor is antispasmodic, and is a valued sedative in allaying abnormal nervous excitability often encountered in women, especially in cases where opium disagrees or is undesirable. It is, in full doses, a sedative to the generative functions and allays pain attending menstruation. Poisoning has followed the use of a saturated solution in alcohol (Rubini's tincture, or so-called "mother-tincture"), which should not be used, as so small a quantity as 7 minims have produced poisonous effects. Toxic doses give rise to inflammation of the stomach. In cases of poisoning, if any of the drug remain in the stomach it should be removed by the stomach-tube, the patient allowed to drink cold water freely, magnesium sulphate (℥j) given, and the symptoms combated with arterial stimulants and hypodermatic injections of morphine and atropine.

Therapy.—Camphor is highly prized in the household, for headaches and various neuralgic pains, the spirit or "Eau Sedative" being applied upon a flannel bandage. It is also a common ingredient in popular liniments.

Camphor-chloral is used in neuralgia and myalgia as a rubefacient and anodyne. It dissolves morphine readily:—

℞ Morphinæ sulphat., ... gr. xx.
Camphor. chloral., ... ℨij.—M.
For local application to painful spots.

Campho-phenique (camphor and carbolic acid) is a valuable antiseptic dressing for wounds, the odor being more pleasant than that of carbolic acid, and, the solution being anodyne, it cannot be diluted with water or glycerin, but mixes with oil or ointments. Salol and camphor and beta-naphthol and camphor also form fluids having a valuable antiseptic power. A solution of camphor in ether (30 in 180) has been applied to erysipelatous inflammation with benefit. Camphor has been used for the purpose of aborting boils. The seat of inflammation is touched three times a day with an alcoholic solution, and, after this has evaporated, the surface is covered with camphorated oil. A saturated solution of camphor in cologne-water gives relief in the headache which may occur at the menopause. Camphor and morphine, incorporated in

a flaxseed poultice, allay toothache. A liniment or ointment containing camphor is useful in chilblains. The camphor ointment of our National Formulary may be used as an application to indolent ulcers. Camphor, either alone or combined as follows, yields serviceable antipruritics in eczema and paræsthesia:—

℞ Camphoræ,	
Beta-naphthol.,	āā gr. x.
M. et adde	
Ol. anthemidis,	♏v.
Bismuth. subnit.,	ʒj
Pulveris marantæ,	ʒj.
Ungt. zinci oxidi,	℥j.—M.

℞ Camphoræ,	gr. x.
Sulphuris sublimati,	ʒss.
Ol. eucalypti,	♏x.
Creasoti,	♏viij.
Ungt. aquæ rosæ,	
Ungt. zinci oxidi,	āā ℥ss.—M.

Camphor with salicylic acid (14 to 11) combines with the aid of heat, and, in the form of ointment, has been used in lupus and chronic ulcers. The odor of camphor is inhaled with some relief in coryza. Camphor cerate is a useful application for chapped hands and roughness of the skin, or the camphor can be incorporated in suet or lanolin:—

℞ Camphoræ,	ʒss.
Ol. neroli,	♏iij.
Acidi carbolici,	♏iv.
Sevi,	℥ij.

M. Sig.: Rub a small piece in the palm of the hand until soft, and apply over the surface for chronic eczema, chapped hands, fissures on the lips, at the angle of the mouth, or around the nipples, anus, or genital organs.

℞ Camphoræ,	gr. xx.
Ol. juniperi,	♏xx.
Lanolin.,	℥j.

M. Sig.: Use in the diseases above named.

Internally, camphor is valuable as an anodyne, antispasmodic, and carminative, in disorders of the digestive organs attended with pain or cramps, and is generally combined with astringents and opiates. Velpeau's diarrhœa mixture consists of equal parts of spirit of camphor, tincture of opium, and compound tincture of catechu.

In diarrhœa, Hope's camphor mixture is useful (see page 381), especially in diarrhœa of relaxation in elderly subjects. Parrish's camphor mixture (mistura camphoræ aromatica, N. F.) is also valued:—

℞ Tr. lavandulæ co.,	f℥iv.
Sacchari,	℥ss.
Aquæ camphoræ,	f℥xvj.

M. Sig.: A tablespoonful every three hours for diarrhœa.

This remedy is likewise very serviceable in infantile diarrhœa. It has been found efficient in Asiatic cholera, provided it be given at the inception of the disease.

Camphor, in 2-grain pills, is serviceable in dysmenorrhœa, hysteria, and obscure nervous manifestations in women. It may likewise be given to relieve palpitation of the heart. The monobromate of camphor is esteemed a valuable remedy in chordee and irritable bladder; it has also been used in spasmodic affections, hysteria, epilepsy chorea, delirium tremens, whooping-cough, etc.

℞ Camphoræ,	gr. xx.
Ætheris,	q. s. ad ft. pulv.
Ammonii carbonat.,	gr. xvj.
Pulv. opii,	gr. iv.

M. et div. in chartulas no. xij.
Sig.: Give one every two or three hours, in coryza.

It is a curious fact that the addition of a few drops of camphor to a glass of water will, when injected into the rectum, produce a prompt evacuation of the bowels, thus offering a means of overcoming a tendency to constipation.

Camphor has at times been successfully employed in the management of mania, melancholia, and delirium tremens. A combination of camphor and opium relieves the after-pains of labor. The same drugs are advantageously given in the form of a suppository after operations upon the urethra, and in prostatorrhœa (enlarged prostate), cystitis, and, in fact, in all diseases of the genito-urinary organs, according to these formulæ:—

℞ Camphoræ,	
Iodoform. vel aristol. vel iodol.,	āā ʒj.
Ol. theobromæ,	q. s.

M. et ft. suppos. no. xv.
Sig.: Insert one, when necessary, into the bowel.

℞ Camphoræ,	
Lupulini,	āā ʒj.
Ext. belladonnæ alc.,	gr. iiss.
Ol. theobromæ,	q. s.

M. et ft. no. x.
Sig.: Insert one in the bowel every two or three hours.

Camphor escapes from the system largely by the bronchial mucous membrane, and is a useful remedy in chronic bronchitis, especially when occurring in the weak or aged, or associated with emphysema. Its stimulant virtues render it useful, also, in capillary bronchitis and typhoid pneumonia. This substance may, in fact, be very serviceably adminis-

tered in typhus or typhoid fever, or in the eruptive fevers, in order to strengthen the action of the heart.

Camphorated oil is an excellent application to swollen and painful breasts during lactation.

Borneol is an artificial camphor obtained from oil of turpentine by treating it with hydrochloric acid. It is said to be identical in chemical composition, and to closely resemble, in its physical characters, the natural camphor. According to Stockman, it has the same effects upon the circulation, but shows a tendency to depress or paralyze the pneumogastric nerves, and leads to palpitation of the heart.

Camphoric Acid is the product of the oxidation of camphor with nitric acid. It is without odor, but has a somewhat acid taste. It may be given in doses of 8 to 60 grains. The 1-per-cent. solution in water may be used in laryngological practice as a spray in catarrhal affections; it probably exerts some antiseptic as well as a sedative effect. The local application of a 2-per-cent. solution of camphoric acid is useful in acute coryza. A 1-per-cent. solution is a serviceable gargle in many forms of sore throat. In combination with other remedies, such as boric acid or borate of sodium, it is valuable in treating strangury and irritability of the bladder, and in the night-sweats of phthisis. The ammoniacal urine of cystitis is speedily cleared and rendered acid by the administration of 15 grains three times a day. It is of avail, also, as a local remedy in chronic cystitis, the bladder being washed out twice daily with a ½-per-cent. solution. A stronger solution than 1 per cent. is too irritant for use. In the night-sweats of phthisis camphoric acid is perhaps superior to any other remedy. From an elaborate course of clinical experiments on fifteen phthisical men, aged from 18 to 52 years, Afanasieff has ascertained that, when it has been taken for several successive days and then discontinued, the sweats re-appear, but gradually, and only attain their initial intensity in from three to five days after the last dose. The remedy never gives rise to or increases diarrhœa or hæmoptysis. It causes no unpleasant effects beyond slight headache and some mental excitement, which is succeeded by sound sleep. The suppression of night-sweats is produced by daily doses of 30 grains or more; certainly by single doses of 30 grains, according to the experiments of Combemale. Wood recommends it in spermatorrhœa and in enuresis; it has also been thought to have some influence over epilepsy, chorea, hysteria, and other spasmodic affections. When aniline and camphoric acid are heated, they combine, forming rose-colored crystals, which are soluble in ether or glycerin, and may be used (dose, gr. i–iv) in spasmodic affections. Camphorate of sodium has also been used with similar, but less decided, effects.

CANNABIS AMERICANA (U. S. P.).—**American Hemp.**

CANNABIS INDICA (U. S. P.).—**Indian Hemp.**

Preparations.

Extractum Cannabis Indicæ (U. S. P.).—Extract of Indian Hemp. *Dose*, gr. ss.

Extractum Cannabis Indicæ Fluidum (U. S. P.).—Fluid Extract of Indian Hemp. *Dose*, ♏i–xx.

Tinctura Cannabis (U. S. P.).—Tincture of Indian Hemp (20 per cent.). *Dose*, ♏x–xx.

Cannabinæ Tannas.—Tannate of Cannabin. *Dose*, gr. i–x.

Pharmacology.—The Cannabis sativa (Urticaceæ), grown in the Southern United States and collected while flowering, constitutes Cannabis Americana, of which there are no officinal preparations. It should not be confounded with Asclepias incarnata, which is sometimes called white Indian hemp, or with Canadian hemp or apocynum (see page 448). The flowering tops of the female plant of Cannabis sativa, grown in the East Indies, constitutes Indian hemp. A confection made from it is "haschisch" or "gunjah"; an inferior kind is known as "bhang." The American and East Indian plants are botanically the same, but the latter contains a larger quantity of the active principles, which are a resin, **Cannabin,** and a volatile oil. From the latter may be obtained **Cannabene,** of which the hydride is a crystalline substance. Churrus is the native name for the impure or crude resin.

Physiological Action.—Indian hemp has no local action. Upon the digestion or circulation no marked effect is produced. It acts like opium in first stimulating the nervous system and afterward depressing the vital functions. The primary stage of intoxication is accompanied by exhilaration, which lasts for some time before sleep occurs. During this period the imagination is actively engaged, intent upon visions of its own creation, which at first are pleasant, but which after awhile become disagreeable, like the hallucinations of delirium tremens. It is noticed, as one of the earliest manifestations of the toxic effect, that ideas of distance and relation are remarkably perverted; on account of the rapidity of the mental operations, the ideas of space and time are exaggerated so as to be almost intolerable, and there is often a curious sense of double consciousness. Numbness and tingling in the extremities are observed, followed by anæsthesia and diminution of muscular sense. Cannabis is antispasmodic, analgesic, hypnotic, and aphrodisiac. If a large dose be taken, coma or catalepsy may supervene, but a fatal effect rarely follows. The subsequent results from indulgence in this drug as an intoxicant are dullness and lassitude, vertigo and headache, diuresis, but not constipation. Frequent use of the drug brings about mental deterioration and unfitness for labor.

Therapy.—Owing very largely to the uncertain quality of the drug, hemp has not been used to the extent that its physiological action would warrant. This has now been corrected so that reliable preparations may be obtained from reputable drug-dealers, and we may look forward to a revival of its use; but it is not probable that in this country it will ever be used as an intoxicant as it is in India. In acute mania it has been used, in combination with potassium bromide, with excellent results. Cannabis Indica may be successfully prescribed in order to combat the wakefulness of delirium tremens, and good results have been ascribed to it in the management of tetanus. It has been employed with advantage in chorea, and may sometimes be of avail in epilepsy. Amelioration has been produced by this remedy in senile trembling and paralysis agitans. In neuralgia and migraine good results follow its cautious use. In other painful affections cannabis Indica may be resorted to with advantage. It may be administered to mitigate the suffering caused by the passage of a hepatic or renal calculus. In acute or chronic rheumatism, in gout, and in carcinoma, hemp may often be very serviceable substituted for opium, over which it has the advantage that it does not derange the secretions. In various uterine disorders it is used to relieve pain and bring about contraction of uterine muscular fibre. The pain of dysmenorrhœa may not infrequently be controlled by cannabis Indica. Its influence upon the muscular structure of the womb renders it valuable in menorrhagia. Its virtue is enhanced in this affection by combination with ergot. It has been found particularly useful in the abundant floodings which sometimes precede the menopause, and, in fact, possesses considerable power as a general hæmostatic.

The headaches which attend the grand climacteric will sometimes yield to this remedy. It may be productive of good results in impotence unconnected with gross lesion. In spasm of the bladder and dysuria it gives relief, and also in acute gonorrhœa with chordee we see good effects from its exhibition. It can be given in either of these combinations with marked benefit for relieving the latter distressing symptom:—

℞ Extracti cannabis Indicæ fl.,	f℥ss.
Sodii bromidi,	ℨiij.
Mist. sodæ menth.,	f℥iij.
Syrup. aurantii,	f℥ij.

Sig.: A tablespoonful at bed-time. Repeat every hour or two until relieved.

℞ Extracti cannabis Indicæ,	gr. iij.
Chloral. hydratis,	ℨj.
Extracti opii,	gr. vj.
Ol. theobromæ.,	q. s.

M. et ft. suppositoriæ no. xij.

Sig.: Insert one in the bowel on retiring, and every two or three hours when troubled with chordee.

By some practitioners it is esteemed of value in acute and chronic Bright's disease, the presence of hæmaturia especially indicating its employment. Trial has been made of the drug in diabetes mellitus. Though it may, at times, be able to moderate cerebral irritability, it exerts no marked influence upon the course or severity of the disease. The spasm of asthma is sometimes very rapidly relieved by hemp. In whooping-cough, also, it may prove of service. It is a good remedy in irritable or reflex cough. Germain Sée warmly recommends cannabis Indica as a gastric sedative of particular value in functional disorders of the stomach and bowels attended with pain, acidity, and flatulence. He advises $\frac{3}{4}$ grain of the extract to be given in three doses, or it can be prescribed in the form of the fluid extract and creasote added with great advantage:—

℞ Extracti cannabis Indicæ, fl.,	♏l.
Creasoti,	♏v.
Syrup. acaciæ,	℥iij.

M. Sig.: A teaspoonful before meals.

Cannabis Indica is said to do good in exophthalmic goitre, and to cure, in some instances, the opium or chloral habit. The tannate of cannabin is a good hypnotic, and has been used for insomnia among the insane.

The oil of hemp-seed (oleum cannabis) is a drying, fixed oil expressed from the seeds; it is green in color, disagreeable to smell, and bland to the taste. It is used in the manufacture of a green soft-soap (sapo viridis, U. S. P.) of deservedly high reputation in treating eczema and other skin diseases.

CANTHARIS (U. S. P.).—Cantharides. (Spanish Flies.)

Preparations.

Tinctura Cantharidis (U. S. P.).—Tincture of Cantharides (5 per cent.). *Dose*, ♏i–x.

Linimentum Cantharidis (U. S. P.).—Liniment of Cantharides (15 per cent. in oil of turpentine).

Collodium cum Cantharide (U. S. P.).—Cantharidal Collodion (60 per cent.).

Ceratum Cantharidis (U. S. P.).—Blistering Cerate (cantharides, 35 parts; yellow wax and resin, āā 20 parts; lard, 25 parts).

Ceratum Extracti Cantharidis (U. S. P.).—Cerate of the Extract of Cantharides (representing 30 per cent.).

Charta Cantharidis (U. S. P.).—Blistering Paper (cantharides and Canada turpentine, each 1 part; olive-oil, 4 parts; spermaceti, 3 parts; wax, 8 parts; water, 10 parts; spread on paper).

Emplastrum Picis cum Cantharide (U. S. P.).—Plaster of Pitch and Cantharides; Warming Plaster (Burgundy pitch, 92 parts; cerate of cantharides, 8 parts).

Pharmacology.—Cantharis vesicatoria (class, Insecta; order, Coleoptera) occurs in pharmacy in a dried state, either whole or in a more or less fragmentary condition, or as a brownish powder, in which the bright-

green fragments of the elytra are very noticeable. The dust is very irritating, and the eyes should be protected when the drug is powdered in the mortar. The perfect flies are stronger than the powder, which often has been damaged by the ravages of mites, or lower forms of life. The active principle is **Cantharidin,** a fatty, crystallizable principle (discovered by Robiquet in 1810), contained chiefly in the soft parts, and especially the generative apparatus, the blood, and in the eggs (Leidy). It is soluble in alcohol, ether, chloroform, etc. Besides this, which is the active agent, there is a green oil, black matter soluble in water, a yellow viscid matter, fat, phosphates of calcium and magnesium, acetic acid, and a volatile principle upon which the fetid odor depends, and which, according to Dragendorff, acts upon the system like cantharidin. The green coloring matter appears to be identical with chlorophyll.

Physiological Action.—When applied to the skin, an active preparation of cantharides causes burning pain with hyperæmia, to which, in the course of a few hours succeeds the formation of vesicles, exhibiting a tendency to run together and form a large bleb corresponding with the area of application. If the action is continued, sloughing and ulceration result. The engorgement of the capillaries in the superficial structures is associated with anæmia of the deeper structures. When applied to the chest, the lung underneath becomes pale and anæmic, and, if its action be too long continued, a blister may cause inflammation of the pleura; or it may produce peritonitis if applied to the abdomen. Slight elevation of temperature attends the action of the blister, which may be followed by depression of temperature and weakening of the heart's action. Constitutional effects may be caused by absorption of the active principles through the integument. When introduced into the stomach, cantharides is capable of setting up much irritation and even gastro-enteritis, with vomiting, or purging and tenesmus. The active principles soon pass into the blood, and at first slightly stimulate the heart's action; but the effect is most marked upon the genito-urinary organs, as the kidneys are the chief organs by which they are excreted. Extreme irritation of the bladder is produced, the urine is voided frequently, and, owing to the congested state of the kidneys, often contains albumin and blood. There may be suppression of urine. Associated with this is priapism, with pain in the glans penis, urethra, bladder, and aching in the renal region. The vulgar notion that cantharides causes erotic sensations, or increased sexual power, has no foundation except in the evidences of congestion and inflammation of the urinary passages just referred to. The results of swallowing a few grains of Spanish flies may be quite serious, and it is regarded by the law as a penal offense to administer this drug surreptitiously and with evil intent. The treatment of

poisoning by cantharides is by bland drinks and opiates and a hot bath Bismuth and cocaine are also of service. An anæsthetic may be necessary.

Therapy.—Blisters are usually spread with cerate of cantharides, or preferably with the cerate of the extract of cantharides, the prescription being as follows:—

℞ Cerati extracti cantharidis, q. s.
Fiat emplastrum 2 × 3 in.
Sig.: Apply to designated spot and allow it to remain four hours. Then remove it and substitute a poultice.

The skin overlying the effusion should not be removed, but simply punctured to allow the serum to escape; the spot is then dressed with some bland fat, such as suet or benzoinated lard. A good way to raise a blister is to use the blistering collodion and paint one or two coats over the desired area, and lay over it a piece of waxed paper, under which the blister raises in a few hours. Saint-Philippe has suggested that the danger of strangury may be lessened by the preliminary use of an alkaline diuretic until the urine has become alkaline. It is likewise a good plan to sprinkle a few grains of morphine and camphor over the surface of the blister before it is placed in position. Blisters are employed therapeutically to relieve pain, to reduce inflammation, and as revulsants to promote absorption of inflammatory products. The warming plaster is very useful in pleurodynia. Meningeal or pleural inflammation may be checked by the prompt application of a good-sized blister to the scalp or to the chest. In iritis, blisters behind the ears are often serviceable. In pericarditis, marked relief may be afforded by blistering. A blister over the stomach will arrest obstinate vomiting; and gleet is sometimes cured by a blister to the perineum. Neuralgia is promptly relieved by a small blister to the painful point; and neuritis is cured by flying blisters,—that is to say, a succession of small blisters along the course of the nerve. In acute rheumatism, marked relief is sometimes afforded to a swollen joint by surrounding it with small blisters. A blister over the affected joint is a good remedy in chronic synovitis. A large blister over the heart, applied early in the course of acute rheumatism, is often remarkably successful in reducing temperature and relieving pain; probably, also, it is of use in obviating the tendency to endocarditis, or curing it if present. In pleural effusion, absorption may be hastened in a similar manner, and also the clearing up of the lung after pneumonia. The warming plaster here may be worn for several days, if the skin is not too sensitive. Blisters must be used with caution in aged or debilitated patients; also in children. They

should not be applied to parts deprived of vitality by paralysis, or to cicatricial tissue, or where the skin is poorly nourished. The possibility of absorption and serious results should be kept in mind. Nor should a blister be allowed to remain on too long.

The cerate, or tincture, of cantharides enters sometimes into the composition of pomades or lotions for the treatment of alopecia circumscripta, and cantharidal collodion painted over the patches, every week or ten days, is at times efficacious.

In small doses, not exceeding two or three minims daily of the tincture, cantharides has been commended as a stimulant to the urinary organs, in hæmaturia, Bright's disease of the kidneys, pyelitis, cystitis, incontinence of urine, gleet, and leucorrhœa; but is contra-indicated in active conditions of inflammation. Given in this manner, it will usually relieve chordee. Ringer recommends full doses of the tincture of cantharides, in combination with tincture of iron and phosphoric acid or nux vomica, in the impotence due to old age, sexual excess, or masturbation. Cutaneous affections, especially psoriasis and other squamous diseases, are sometimes much benefited by similar small doses of the tincture. It has been used to produce abortion, and, in these small doses just mentioned, has emmenagogue properties.

The **cantharidate of potassium** has been introduced by Professor Liebreich as a remedy in tuberculosis, especially of the larynx. It is given by hypodermic injection, in doses of 1 to 2 decimilligrammes. The injection excites a moderate degree of pain, but is not generally followed by pronounced febrile reaction. In cases of simple inflammation and tuberculous infiltration of the larynx the cantharidate of potassium causes an exudation of serum, which is, however, quickly reabsorbed. Hoarseness diminishes and swallowing becomes less difficult. Tuberculous ulcers show a tendency to heal. In pulmonary tuberculosis it has been found without effect upon the fever, cough, expectoration, or physical signs. The treatment is apt to excite slight albuminuria and urobilinuria. Benefit has sometimes resulted in cases of lupus and granular lids.

CAPSICUM (U. S. P.).—**Capsicum.***

Dose, gr. i–xx.

Preparations.

Extractum Capsici Fluidum (U. S. P.).—Fluid Extract of Capsicum (alcoholic). *Dose,* ♏i–v.

Oleoresina Capsici (U. S. P.).—Oleoresin of Capsicum. *Dose,* ♏$\frac{1}{20}$–ij.

Tinctura Capsici (U. S. P.).—Tincture of Capsicum (10 per cent.). *Dose,* ♏v–f℥ij.

Emplastrum Capsici (U. S. P.).—Capsicum Plaster (contains oleoresin).

Infusum Capsici.—Infusion of Capsicum (℥ss–Oj). *Dose,* f℥ii–℥ss.

* See paper by author on Capsicum, in the Medical Bulletin, November, 1886.

Pharmacology.—The fruit of Capsicum fastigiatum (Solanaceæ), dried and powdered, constitutes capsicum, or red pepper, which grows in the East Indies and on the coast of Guinea. Different varieties are cultivated all over the world for culinary and medicinal purposes. The Capsicum annuum is most common in this country, of which there are a number of varieties, having different-shaped pods or large berries, the latter being picked green and used for pickling with vinegar. The chief constituent of red pepper is a crystallizable, acrid substance, **Capsaicin** (Thresh); also a yellow oil, resin, and a volatile alkaloid which in its odor resembles coniine.

Physiological Action and Therapy.—Capsicum occasions irritation when applied to the skin, and may produce vesication; it acts as a counter-irritant in relieving pain in the structures beneath, especially in neuralgia, subacute gout, chronic gout, rheumatism, and bronchitis. In the mouth the taste is hot and pungent, causing free flow of saliva, and similarly increasing the flow of gastric juice, producing warmth in the stomach, expelling flatus, and giving increased appetite and digestive power. Capsicum stimulates the action of the heart and increases the digestive functions. It promotes the excretion of urine and possesses an aphrodisiac influence. A prescription of much utility in debility of the sexual organs is:—

℞ Pulveris capsici,
Extracti erythroxyli, ... āā ʒj.
M. et ft. pilulæ no. xxx.
Sig.: Two pills three or four times a day.

The capsicum plaster may be used when mild counter-irritation is desired.

The tincture of capsicum may be employed with advantage in chilblains when the surface is unbroken. Dr. Rheims recommends that a strong tincture of capsicum-pods should be mixed with an equal quantity of mucilage of gum arabic. The mixture is brushed two or three times upon tissue-paper, which is then applied to the affected surface and quickly relieves the itching and pain. Discolored bruises and chronic rheumatic pains are likewise benefited by the same treatment. Sawyer suggests a tincture of capsicum made with officinal, pure ether in place of rectified spirit. He reports* that ether, by its action on the sebaceous secretion of the skin, is preferable to alcohol as a menstruum for drugs designed to produce a therapeutic effect on or through the skin. It has also the advantage that oil of turpentine or a bland oil is easily miscible with it, if requisite to add either. He states that a mixture of equal parts of ethereal tincture of capsicum, liquor ammoniæ, oleum terebin

* London Lancet, May 17, 1890.

thinæ, and oleum lini forms an excellent rubefacient liniment. An infusion of capsicum-pods applied upon a piece of lint is remarkably efficacious in acute torticollis.

The tincture of capsicum is an excellent application to the mucous membrane of the mouth and especially the gums. It enters into very many tooth-washes, the following, used by Garretson, being very serviceable:—

℞ Tinct. capsici,	fʒij.
Spiritus odorat.,	f℥ij.
Alcoholis,	f℥ij.
Tinct. quillaiæ,	f℥iss.
Tinct. gentianæ comp.,	f℥j.
Acidi acetici diluti,	f℥ss.
Acidi carbolici,	♏ij.—M.

Capsicum infusion is used as an application to scarlatinal sore throat, or diluted as a gargle in tonsillitis, pharyngitis, or may be used as a gargle, thus:—

℞ Tinct. capsici,	fʒj.
Potassii chloratis,	ʒiij.
Glycerini,	f℥ij.
Acidi hydrochlor. dil.,	fʒiij.
Aquæ rosæ,	ad fʒxij.

Capsicum may be used externally as a hair-lotion for promoting the capillary growth:—

℞ Tinct. capsici,	f℥ss.
Tinct. saponariæ quil.,	f℥j.
Glycerini,	ʒij.
Tinct. cantharidis,	fʒiij.
Spiritus rosmarini,	f℥iss.
Aquæ rosæ,	ad f℥viij.

M. Sig.: Drop on the hair night and morning and brush the scalp well.

Capsicum is given internally after a debauch or in cases of drink-craving, as a substitute for alcoholic drinks. In chronic catarrh of the stomach of drunkards, the tincture of capsicum, in 10-drop doses before meals, serves as an appetizer. The tincture of capsicum is a valuable stimulant in delirium tremens. It may very serviceably be administered in beef-tea, and supports the heart, allays restlessness, and promotes sleep. Capsicum, in fact, possesses a slight narcotic power, and can be given thus with marked effect:—

℞ Tincturæ capsici,	fʒij.
Sodii bromidi,	ʒiij.
Elix. lupulini,	f℥iv.

M. Sig.: Two teaspoonfuls in water every hour or two.

It is an excellent remedy in flatulent dyspepsia :—

℞ Pulveris capsici, ...	gr. xl.
Extracti nucis vomicæ, ...	gr. iij.
Extracti pancreatis, ...	ʒj.

M. et ft. capsulæ no. xx.
Sig.: A capsule after meals.

It is beneficial in typhoid fever and typhoid conditions, as a stimulant. As this substance invigorates the muscular coat of the arteries, it may be advantageously employed in order to control hæmorrhage from the lungs or the womb. On account of its irritant effects, it is contraindicated in acute inflammation of the stomach or bowels. As excretion takes place by the kidneys, capsicum should be prohibited in inflammatory conditions of the genito-urinary tract; but in chronic disorders it may often be employed with advantage. In chronic nephritis, pyelitis, cystitis, and prostatorrhœa it frequently proves decidedly beneficial.

CARBO ANIMALIS (U. S. P.).—Animal Charcoal.

CARBO LIGNI (U. S. P.).—Wood Charcoal.

Dose, gr. x–xx.

Preparation.

Carbo Animalis Purificatus.—Purified Animal Charcoal. *Dose*, gr. x–ʒj.

Pharmacology.—Animal charcoal is prepared from bone by exposure to heat; and wood charcoal is obtained by a similar process from soft wood. The former occurs as a black powder or mass, the latter in large fragments preserving the shape of the billets of wood, or as a fine light powder. Purified animal charcoal is the charred bone after treatment with hydrochloric acid, which removes the earthy salts and leaves only the carbon. Recently-burned charcoal not only readily absorbs gases, and is thus an excellent deodorizer, but it destroys organic impurities by oxidation, decolorizing solutions containing them and rendering them inoffensive to taste or smell. Internally, it is given in too small doses to exert much effect of this kind in the intestinal tract, but it aids in purifying the stomach, partly by mechanical action. It increases secretion and peristalsis.

Therapy.—Charcoal is a good dressing to old or offensive gangrenous ulcers, as it absorbs the foul material and cleans the wound. It is generally utilized in the form of the charcoal poultice, being beaten up with bread-crumb or flaxseed-meal, or a small bag filled with powdered charcoal may be laid upon the poultice when it has been placed in position. It is sometimes used for tooth-powder, but is open to the objection of scratching the teeth and discoloring the gums. Charcoal filters are useful

in pharmacy, but not in the household, because, if not renewed daily, they lose their virtues, and only act as a breeding-place for germs of putrefaction and disease. Charcoal in powder, or animal charcoal, may be administered in cases of poisoning by organic poisons. In flatulent dyspepsia recently-burned charcoal is sometimes beneficial. It has been used to relieve the pain of gastric ulcer and gastralgia.

CARBONEI BISULPHIDUM (U. S. P.).—**Bisulphide of Carbon.**

Pharmacology and Therapy.—The bisulphide (disulphide) of carbon is a clear, very diffusive liquid, of extremely offensive odor, and inflammable. It is highly poisonous, and its odor is also an objection to its internal use, although it is a valuable antiseptic, and has been used in typhoid fever, dyspepsia, and in gastric cancer. It has some anæsthetic and anodyne properties when inhaled. Locally, the vapor has been proposed to be applied for glandular enlargements and in defective secretion of cerumen in the ear. Local anæsthesia may be produced by the spray in neuralgia, etc.

CARDAMOMUM (U. S. P.).—**Cardamom.**

Dose, gr. v–xv.

Preparations.

Extractum Cardamomi Compositum Fluidum.—Compound Fluid Extract of Cardamom (cardamom, cinnamon, āā 400 parts; caraway, 200 parts; cochineal, 100 parts; reduce to powder and percolate with alcohol, obtaining 880 parts; add glycerin, 120 parts). *Dose,* ♏xv.

Tinctura Cardamomi (U. S. P.).—Tincture of Cardamom (15 per cent.). *Dose,* f℥i–ij.

Tinctura Cardamomi Composita (U. S. P.).—Compound Tincture of Cardamom (cardamom 2, cinnamon 2, caraway 1, cochineal ½, glycerin 6, in dilute alcohol, q. s. ad 100 parts). *Dose,* f℥i–iv.

Cardamom also enters into the composition of aromatic powder (cardamom and nutmeg, āā 15 parts; cinnamon and ginger, āā 35 parts), and the aromatic fluid extract (pulv. aromatic., 100 grains; alcohol, q. s. ad 100 minims) and elixir adjuvans (N. F.).

Pharmacology.—The fruit of Elettaria cardamomum (Zingiberaceæ) comes from Malabar, although other sources are recognized in commerce. The seeds are inclosed in capsules, the latter being valueless except as a protection for the former, which contain a volatile oil holding a camphoraceous substance in solution.

Therapy.—The seeds of cardamom are sometimes chewed and swallowed to relieve flatulence, or the tincture or compound tincture may be used, the latter being a valuable carminative combination. The compound fluid extract, though not officinal, is considered a better preparation than the compound tincture in the treatment of atonic dyspepsia and flatulence.

CARDUUS BENEDICTUS.—Blessed Thistle.

Dose, ʒi–v.

Pharmacology.—This plant belongs to the Compositæ, and is a native of Asia and Europe. The leaves, sometimes the flowering tops, are used in decoction (℥ii–Oj), and a fluid extract and solid extract have also been used. A bitter neutral principle, **Cnicin,** crystallizing in colorless prisms, soluble in alcohol, less so in water, appears to be the principal constituent; nitrate of potassium is also present.

Therapy.—Carduus is a bitter tonic used in Germany in digestive weakness and chronic hepatic complaints; best given as the fluid extract (♏xv–fʒj at a dose), in which the menstruum is diluted alcohol. The **Carduus Marianus,** or St. Mary's Thistle, another variety, is used for the same purposes, but is especially in repute for treating cases of gall-stones. It has also been extolled as a hæmostatic, laxative, and diuretic (Lobach).

CARMINUM.—Carmine.

The red coloring matter obtained from cochineal; entirely soluble in water. (See Coccus.)

CAROTA.—Carrot Fruit.

Dose, gr. xxx–ʒj.

Pharmacology and Therapy.—The seeds of Daucus carota (Umbelliferæ), of a grayish color, about ⅛ inch in length, contain a volatile oil of aromatic odor and taste. Used in powder as a carminative and diuretic.

CARUM (U. S. P.).—**Caraway.**

Dose, gr. x–xxx.

Preparation.

Oleum Cari (U. S. P.).—Oil of Caraway. *Dose,* ♏i–v.
Enters into compound spirit of juniper and compound tincture of cardamom.

Pharmacology and Therapy.—The fruit of Carum carvi (Umbelliferæ) contain a volatile oil, and are prized as a condiment. They are used as a stimulant in flatulence, or in combination to prevent griping of other medicines. A case has been reported in which 1 drachm of the oil of caraway produced cerebral congestion, delirium, and rigors in a man.

CARYOPHYLLUS (U. S. P.).—**Cloves.**

Preparations.

Oleum Caryophylli (U. S. P.).—Oil of Cloves. *Dose,* ♏i–vj.
Infusum Caryophylli.—Infusion of Cloves (2 per cent.). *Dose,* f℥i–ij.
Also enters into compound tincture of lavender, aromatic tincture of rhubarb, aromatic syrup of rhubarb, and wine of opium.

Pharmacology.—Cloves are the dried, unexpanded flowers of Eugenia caryophyllata (Myrtaceæ), a large tree of the Spice Islands and Africa. They are dark-drown in color, about half an inch long, and have a strong, spicy odor and pungent, aromatic taste, owing to the presence of a heavy volatile oil (15 to 20 per cent.). They also contain **Eugenin,** a tasteless crystalline substance, salicylic acid, and a neutral, tasteless, odorless body, **Caryophyllin,** which crystallizes in needles. Clove-stalks are the flower-stalks of the cloves; mother-cloves are the whole fruit. Both of these are used to adulterate ground cloves.

Physiological Action.—Cloves are stimulant, carminative, and antiseptic. The oil has some anæsthetic influence over painful areas. The oil of cloves is eliminated by the kidneys, liver, bronchial mucous membrane, and skin. It possesses antiseptic virtues.

Therapy.—The oil of cloves is used to destroy the nerve in hollow, aching teeth, and quickly relieves pain. In combination with lanolin, it may be used for eczema. The infusion is used internally as a stomachic tonic for the relief of flatulence and pain, but it is generally employed in combination with other remedies. The growth of tubercle bacilli is retarded by tincture of cloves, and Mannotti, in eighteen cases of local tuberculosis, obtained marked improvement from injections of a 10-per-cent. emulsion of cloves in olive-oil. In lupus vulgaris the repeated application of oil of cloves is said to cause separation of the epithelium and retrocession of the nodules. Eugenol, a constituent of the oil of cloves, has been combined, by a patented process, to form a compound termed benzoyl-eugenol, or benz-eugenol. This product, it is thought, may prove useful in the treatment of tuberculosis.

CASCA CORTEX.—Sassy Bark.

Pharmacology.—The Erythrophlœum guineense (Leguminosæ) is a large tree growing on the coast of Africa, which furnishes the ordeal bark of Angola; otherwise casca, or sassy, bark. It contains an alkaloid, **Erythrophlœine.** A tincture (10 per cent.) has been used by Brunton, in doses of 5 to 10 minims.

Physiological Action.—The powder causes sneezing when inhaled. The infusion or tincture gives rise to vomiting and purging and intoxication, followed by death during convulsions. Upon the circulation erythrophlœum has an action like digitalis.

Therapy.—In its native country sassy bark is employed in the treatment of intermittent fever, flatulent dyspepsia, diarrhœa, and dysentery. Brunton finds the tincture useful in dilated heart without valvular disease; also in mitral disease and dropsy. It disturbs the digestion more than digitalis. The hydrochlorate of erythrophlœum is a

salt in the form of a powder, soluble in water, which can be administered hypodermatically in doses of gr. $\frac{1}{80}$–$\frac{1}{12}$ as a local analgesic, but it is inferior to cocaine for this purpose.

CASCARA AMARGA.—Honduras Bark.

Pharmacology and Therapy.—The Cascara amarga (Simarubaceæ), or Honduras bark, has some reputation as a tonic and alterative. The fluid extract (dose, f℥ss–j, several times a day) may be used in syphilis, chronic liver disease, nasal catarrh, and skin diseases (eczema, psoriasis, syphilodermata, etc.).

CASCARA SAGRADA. See Rhamnus Purshiana.

CASCARILLA (U. S. P.).—**Cascarilla-Bark.**

Dose, gr. ii–xx.

Pharmacology.—The bark of Croton eluteria (Euphorbiaceæ) from the Bahama Islands. It has a warm, rather bitter taste, and emits a fragrant odor when burned. **Cascarillin** is a bitter neutral substance, with volatile oil, resin, and tannin as the principal constituents. There are no officinal preparations, but a fluid extract, infusion, and tincture are used, none of which are miscible with water.

Therapy.—Cascarilla is a light tonic, somewhat stimulant and carminative, and the infusion has been used in low fevers. It may be profitably employed as a tonic in convalescence from typhoid fever or other exhausting disease.

CASSIA FISTULA (U. S. P.).—**Purging Cassia.**

Dose, ℨj.

Pharmacology and Therapy.—The fruit of Cassia fistula (Leguminosæ), a tree of the West Indies, is in cylindrical pods of a dark-brown color, containing from twenty-five to one hundred seeds in separate cells, and a dark-brown, soft, sweetish pulp, having an odor like prunes and containing about 60 per cent. of sugar. Good cassia yields about 30 per cent. of the pulp, which is the medicinal part of the drug. This is laxative in its action in doses of a drachm or more. There are no officinal preparations of cassia, but the confection of senna contains 16 per cent. of cassia fistula.

CASTANEA (U. S. P.).—**Chestnut.**

Preparations.

Extractum Castaneæ Fluidum (U. S. P.).—Fluid Extract of Chestnut. *Dose,* f℥i–ij.
Infusum Castaneæ.—Infusion of Chestnut-Leaves. *Dose,* f℥ii–℥ss.

Pharmacology and Therapy.—The leaves of Castanea vesca (Cupelliferæ), collected in September or October while still green. They contain

tannin, gallic acid, salts, and gum. A recent infusion has been employed with success in whooping-cough, and might be used for diarrhœa, but for the latter purpose the fluid extract would be better.

CATECHU (U. S. P.).—**Catechu.**
Dose, gr. i–xxx.

Preparations.

Tinctura Catechu Composita (U. S. P.).—Compound Tincture of Catechu (catechu 12, cinnamon 8, in diluted alcohol, q. s. ad 100 parts). *Dose,* ♏x–f℥j.
Trochisci Catechu (U. S. P.).—Troches of Catechu (1 grain each). *Dose,* 1 or more.

Pharmacology.—Catechu is obtained from the Acacia catechu (Leguminosæ), a large tree of Pegu. It is in large masses, hard and brittle, glossy and porous on fracture; taste strongly astringent and sweetish; very little odor. The constituents of black catechu, or cutch, are **Catechu-Tannic Acid** and **Catechin,** the latter being insoluble in water; but the extract is entirely soluble in alcohol, though insoluble in ether. With iron, greenish-brown precipitates are formed.

Therapy.—Catechu is a valuable astringent. It may be used as a mouth-wash for spongy gums, a gargle in pharyngitis, or as an injection in gonorrhœa or leucorrhœa; but is most frequently employed in diarrhœas of relaxation.

CATHA.—**African Tea.**

A small shrub of Northwestern Africa, used by the natives as a stimulant and temporary substitute for food. Forskall gave it the name of Catha edulis. The leaves are chewed like those of the Erythroxylon coca, and are invigorating and restorative, and the recent infusion acts like that of tea, maté, or coffee. The plant has been analyzed without detecting caffeine. Fluckiger has isolated an alkaloid, **Katine,** which is probably a liquid.

An alkaloid, which seems to be the active principle, has recently been isolated by Prof. Ugolino Mosso, of Genoa.* To this substance the discoverer has given the name of **celastrine.** It is present in the plant in such small quantities that its exact chemical composition has not yet been determined. During a primary stage and in small doses, celastrine is stimulant to the nervous system of frogs; during a secondary stage and in large doses, it is depressant. It produces an excitant effect upon the heart of the same animal. In dogs and rabbits, blood-pressure and respiration were not notably influenced, but the activity of the sympathetic nerve was modified. In his experiments, Professor Mosso found celastrine fatal in amounts in which cocaine is merely excitant. In intoxication from celastrine sensibility is preserved to the last and con-

* See Medical Bulletin, August, 1891.

vulsions are lacking. The stimulant effect of celastrine is essentially manifested upon the brain, without leaving a trace of depression or visible disturbance of function. The spinal cord, vagi nerves, and heart may share the stimulant effect, but are less powerfully affected.

In medicine, catha might be useful as an arterial and nervous stimulant like coca, and probably would afford a cheap substitute at the table for the expensive tea so largely used, if once introduced in this country.

CAULOPHYLLUM (U. S. P.).—**Caulophyllum, Blue Cohosh.**

Dose, gr. xv–xl.

Preparation.

Extractum Caulophylli Fluidum.—Fluid Extract of Caulophyllum. *Dose,* ♏xv–xl.

Pharmacology.—The rhizome and rootlets of Caulophyllum thalictroides (Berberidaceæ), or squaw-root, a plant indigenous to this country. It contains a glucoside, **Saponin,** and two resins, the latter constituting the substance supplied as **Caulophyllin.**

Therapy.—Caulophyllum is emmenagogue and parturifacient and diuretic. It has some reputation in the treatment of rheumatism. It probably has some value as an expectorant, owing to the presence of saponin, which is analogous to senegin found in Polygala senega, and might be valuable in bronchitis and catarrhal pneumonia.

CERA.—**Wax.**

Preparations.

Cera Alba (U. S. P.).—White Wax (yellow wax bleached).
Cera Flava (U. S. P.).—Yellow Wax.
Ceratum (U. S. P.).—Cerate (white wax 30, lard 70).

Pharmacology and Therapy.—Wax is a peculiar, concrete substance, prepared by Apis mellifica (Hymenoptera, class Insecta), forming the honey-comb; also found in certain plants. It is insoluble in water and cold alcohol, but soluble in boiling alcohol, ether, chloroform, and oils. It is a soft solid, liquefying a little above the body-temperature, and is unirritating, except mechanically, to the skin and mucous membranes. It is largely used to give consistency to ointments and suppositories.

CERII OXALAS (U. S. P.).—**Oxalate of Cerium.**

Dose, gr. i–x.

Pharmacology.—The oxalate of cerium occurs as a white, granular powder, odorless and tasteless, insoluble in water or alcohol, but soluble in hydrochloric acid.

Therapy.—Sir J. Y. Simpson brought forward this remedy as one of great value in treating the vomiting of pregnancy, in which it is sometimes successful, but often fails. It is useful in controlling excessive cough in phthisis or chronic bronchitis, and in nervous disorders, chorea,

epilepsy, and dysmenorrhœa. This salt occasionally proves useful in vomiting depending upon uterine disease, or even in cancer of the stomach. It is a sedative to the gastric mucous membrane, and may allay the pain of gastralgia. The following prescriptions, containing oxalate of cerium, have been employed with service :—

℞ Cerii oxalatis, ... ʒiss.
Bismuth. subnit., ... ʒiiss.
Spiritus chloroformi, ... fʒij.
Liquor. calcis,
Syrup. acaciæ, ... āā f℥ij.
M. Sig. : Two teaspoonfuls in water when necessary for nausea and diarrhœa.

℞ Cerii oxalatis, ... gr. xl.
Ext. hyoscyami alc., ... gr. iij.
Ext. conii, ... gr. vj.
Ext. gent., ... gr. ij.
M. et ft. pil. no. xij.
Sig. : A pill every four hours for nausea and vomiting, especially of pregnancy.

The oxalate of cerium is also occasionally efficacious in chronic diarrhœa. It is liable to be contaminated with other metals, such as arsenic, lanthanum, etc., to which some of its therapeutic effects have been attributed.

If the remedy be pure, it may be given in doses of **10** grains every four hours. Failure from its use has been ascribed to the smallness of the dose which is generally prescribed.

CETACEUM (U. S. P.).—Spermaceti.

Preparations.

Ceratum Cetacei (U. S. P.).—Spermaceti Cerate (10 per cent.).
Unguentum Aquæ Rosæ (U. S. P.).—Rose-Water Ointment (expressed oil of almonds, 50 parts; rose-water, 30 parts; spermaceti and white wax, of each, 10 parts).

Pharmacology.—Spermaceti is a peculiar, concrete, fatty substance obtained from Physeter macrocephalus (class, Mammalia; order, Cetaceæ), or sperm-whale. It is a fatty substance, with little taste or odor; can be reduced to a powder by the addition of a little alcohol. Unlike other fats, it does not yield glycerin when saponified, but **Ethal.** It is almost pure **Cetin**, or palmitate of cetyl. It is not acted upon by a boiling dilute solution of soda, and leaves no grease-spot on paper.

Therapy.—Used almost exclusively as an ingredient in ointments, although an emulsion with wax and yelk of egg is prepared as a demulcent in irritation of the bowels. The unguentum aquæ rosæ, or cold cream, is an elegant application for excoriated surfaces and chapped hands and lips.

CETRARIA (U. S. P.).—**Iceland Moss.**

Preparation.

Decoctum Cetrariæ (U. S. P.).—Decoction of Iceland Moss (5 per cent.). *Dose*, f℥i–iv.

Pharmacology.—The sea-weed, Cetraria islandica (Lichenes), is found in northern latitudes. It contains **Lichenin**, or lichen-starch (70 per cent.), which forms a mucilage when hot water is added. There is also cetrarin or cetraric acid, a bitter principle (about 2 per cent.), which can be removed by washing with a weak alkali.

Therapy.—It has some value as a food, and its demulcent qualities have led to its use in pulmonary affections and bowel disorders in the form of decoction.

Kobert has ascertained that cetrarin increases intestinal peristalsis, augments the number of red and white blood-corpuscles, especially when they have been reduced by disease, and is a mild stimulant to the central nervous system. It may, therefore, prove of service in chlorosis attended by loss of appetite and constipation. The dose is given as 1½ grains.

In Iceland cetraria is esteemed prophylactic against a prevalent form of elephantiasis. Dr. Eckfeldt states that cetraria possesses antihæmorrhagic power and has been recommended in hæmoptysis. The powder, blown into the nostrils, will arrest epistaxis. A tincture of cetraria is a good application to spongy gums. The therapeutical properties of the lichens have been studied by Dr. Eckfeldt.* Rocella tinctoria is astringent, diuretic, and a demulcent expectorant. Species of the genera Usnea and Alectoria are useful, locally and systemically, in hæmorrhoids. Among the Parmelias, several exert an antiperiodic influence. Reindeer-moss is a demulcent tonic, diuretic, astringent, and alterative.

CHAULMOOGRA-OIL.—**Chaulmoogra-Oil.**

Dose, ♏v–xx, in capsule.

Pharmacology and Therapy.—The expressed oil from the seeds of Gynocardia odorata (Bixineæ) contains gynocardic acid. The oil is soluble in ether, chloroform, and alcohol. In leprosy, chaulmoogra-oil has been used, with asserted good results, both locally and internally. Though unable to cure the disease, it has in some cases delayed the progress and mitigated the symptoms. It may also be serviceable, combined with other ointments, in treating chronic skin diseases. Chronic eczema, psoriasis, and lupus are benefited by the application of an ointment containing chaulmoogra-oil. The ointment has likewise been used upon the enlarged glands of scrofula and in chronic rheumatic arthritis. From 20 to 30 grains of the oil to the ounce of excipient is the average strength of the ointment.

* "Chemical and Medicinal Properties of Some Lichens," Medical Bulletin, March, 1892.

℞ Zinci carbonat.,
Pulv. marantæ, ... āā ʒj.
Olei chaulmoogræ (*vel* acidi gynocardici), ... fʒss.
Ungt. hydrarg. ammoniat., ... ʒij.
Lanolini, ... ℥ss.

M. et ft. ungt.

For chronic eczema, psoriasis, scrofuloderma, lupus, and lepra.

CHEKAN.—Cheken.

Preparation.

Extractum Chekan Fluidum.—Fluid Extract of Cheken. *Dose*, fʒi–iij.

Pharmacology.—The leaves of Myrtus chekan, or Eugenia chekan (Myrtaceæ), a shrub or small tree of South America. It contains tannin and an ethereal oil; also chekenon, chekenic acid, cheken bitter, chekenetin. Of these the ethereal oil alone offers medicinal interest (Weiss). This is antiseptic, diuretic, and expectorant.

Therapy.—Cheken was introduced from Chili through the enterprise of Messrs. Parke, Davis & Co., as a remedy in chronic catarrhal inflammation of the respiratory passages. Dr. Murrell, of London, extols it in the winter-cough of elderly people, and in other forms of chronic bronchitis. In Chili it also enjoys a reputation in the treatment of rheumatism.

CHELIDONIUM (U. S. P.).—Chelidonium, Celandine.

Dose, gr. x–xl.

Pharmacology.—Celandine is the whole herb of Chelidonium majus (Papaveraceæ), found both in Europe and North America. It contains two alkaloids, **Chelidonine** and **Sanguinarine,** in combination with **Chelidonic Acid.** A bitter, yellow, crystalline principle, **Chelidoxanthine** (Probst), is also present, besides tannic acid, starch, cellulose, etc.

Physiological Action.—It has a bitter, acid taste, and stimulates the secretions of the glands along the intestinal tract, including the liver. In considerable doses it causes vomiting and purging, diaphoresis, and increases the urinary secretion and also the secretions of the bronchial mucous membrane.

Therapy.—The fresh, milky juice may be used as a local irritant, and has been applied upon warts and corns. Internally, in doses of 10 grains of the extract, it acts as a drastic purgative, and has been used in jaundice due to catarrhal swelling of the bile-ducts.

CHENOPODIUM (U. S. P.).—Chenopodium, American Wormseed.

Dose, gr. x–xl.

Preparation.

Oleum Chenopodii (U. S. P.).—Oil of Chenopodium. *Dose,* ♏v–xx.

Pharmacology.—American wormseed is the fruit of Chenopodium ambrosiodes, variety Anthelminticum (Chenopodiaceæ), a plant of North America and Europe. It has a peculiar aromatic odor and a warm, bitter taste. Its properties are due to the presence of a peculiar volatile oil, a thin, yellowish, offensively aromatic liquid, which is officinal.

Physiological Action and Therapy.—The volatile oil acts as a stimulant to the circulation and nervous system, making it serviceable in chorea and neurasthenia. Its common use is for the expulsion of lumbricoid worms, and it is best given in doses of 10 minims, in capsules or emulsion, three times a day, castor-oil being administered the following day; or the remedy may be administered night and morning for several days, and followed by a brisk cathartic.

CHIMAPHILA (U. S. P.).—**Chimaphila, Pipsissewa.** (Prince's Pine.)

Preparation.

Extractum Chimaphilæ Fluidum (U. S. P.).—Fluid Extract of Chimaphila. *Dose*, ♏xx–xl.

Pharmacology.—The leaves of Chimaphila umbellata (Ericaceæ) contain tannin and a colorless, bitter, crystalline, neutral principle, **Arbutin,** and a colorless and tasteless substance, in yellow crystals, **Chimaphilin.** The fresh leaves are also slightly irritating.

Physiological Action and Therapy.—Pipsissewa is diuretic and alterative. It has very little effect upon the heart or circulation. Upon the digestive organs it is tonic and astringent. As it is not an irritating diuretic, it can be used in Bright's disease and nephritis; also in hæmaturia. In lithæmia, gout, rheumatism, and kindred disorders, this is a valuable remedy. As it favors elimination, it has produced good results in scrofula, skin diseases, gleet, leucorrhœa, and intermittent fever. A decoction (℥ii–Oj) may be used, but a good fluid extract is better.

CHINA. China-Root.

Pharmacology and Therapy.—The rhizome of Smilax glabra and Smilax China (Smilaceæ) of China and Japan has the same constituents and properties as sarsaparilla, but is more active. It is best given in the form of fluid extract of China, in doses of fℨss–j, several times a day.

CHINOIDINUM (U. S. P.).—**Chinoidin, Quinoidin.**

Pharmacology.—A mixture of alkaloids, mostly amorphous, obtained as a by-product in the manufacture of the crystallizable alkaloids of cinchona. (See Cinchona.)

CHINOLINA.—Chinolin, Quinolin.

Dose, gr. viii–xvj.

Preparations.

Chinolinæ Salicylas.—*Dose*, gr. v–xxx. *Chinolinæ Tartras.*—*Dose*, gr. v–xxx.

Pharmacology.—Chinolina is a colorless, oily liquid, darkening on exposure to light, and is a constituent of coal-tar, but is prepared commercially by treating anilin or nitro-benzol with glycerin in the presence of a dehydrating agent. In its chemical characters it is so closely related to quinine as to lead to its substitution in medicine. Dr. Julius Donath claims that its physiological and therapeutical effects are also identical with the natural alkaloid. The tartrate is the salt chiefly used, which is in shining, silky crystals, with penetrating odor and pungent taste, permanent in air, and soluble in water.

Physiological Action and Therapy.—Chinolin is a valuable antiseptic, but its offensive odor has prevented its application in this direction in medicine; however, it is believed that much of this objection can be removed by better modes of preparation. If it could be obtained without odor or taste, it would be a valuable agent for the preservation of food. The tartrate and salicylate are also powerful antizymotics. Internally, these salts are antipyretic and antiperiodic, in doses rather larger than those given of quinine (ʒss daily, for adults).

It may be given to children in peppermint-water, or syrup and distilled water, or to adults in capsules or wafers. Neuralgia dependent upon a malarial taint is often relieved by chinolin tartrate. In zymotic diseases, other than malarial, chinolin has not proved satisfactory as an antipyretic, because it has been found to be too depressing in its effects upon the heart. As a topical application in diphtheria, it may be diluted with alcohol (♏x–f℥j) and used with a spray, or painted on with a brush, to the affected part. A solution of the tartrate (gr. iii–v–f℥j) has been used as an injection for gonorrhœa.

CHIRATA (U. S. P.).—**Chirata.**
Dose, gr. xv–xxx.

Preparations.

Extractum Chiratæ Fluidum (U. S. P.)—Fluid Extract of Chirata. *Dose,* ♏x–xxx.
Tinctura Chiratæ (U. S. P.).—Tincture of Chirata (10 per cent.). *Dose,* fʒi–ij.

Pharmacology.—The whole herb, Ophelia chirata (Gentianaceæ) of India, is used as a bitter aromatic tonic in the East, but rarely prescribed in this country or England. It contains two amorphous principles, **Ophelic Acid** and **Chiratin** (Höhn), but **no tannin.**

Therapy.—Chirata resembles gentian very closely, to which it is allied botanically, but it is more bitter. It has similar therapeutic applications in atonic dyspepsia, etc. Chirata may often be very serviceably combined with bismuth subnitrate, or with hydrochloric acid, for the relief of the sick stomach of drunkards. It is useful in functional inactivity of the liver.

CHLORAL (U. S. P.).—**Chloral, Hydrate of Chloral.**

Dose, gr. ii–xx.

Pharmacology.—Chloral (trichloracetyl hydride) is a colorless liquid formed by the prolonged action of chlorine upon alcohol;* with water it forms a crystallizable compound. The hydrate of chloral is in the form of colorless, transparent crystals; of bitterish, caustic taste; of pleasant, ethereal but not acrid odor; freely soluble in water and in alcohol. The crystals volatilize slowly at ordinary temperatures, and should be kept in a tightly-stoppered bottle; they melt at 135° F. and boil at 208° F., and are at the same time decomposed into anhydrous chloral and water. If concentrated sulphuric acid be added to chloral it is converted into a white, solid substance having the same composition as chloral, but is not soluble in water. Chloral also combines with alcohol to form crystals of alcoholate of chloral, which are less soluble than hydrate of chloral. When triturated with camphor or crystals of carbolic acid, the hydrate of chloral forms a permanent oily liquid.

Physiological Action and Poisoning.—Chloral hydrate is antiseptic and sedative, although slight irritation may occur at first. It is a hypnotic, causing sleep by producing an anæmic condition of the brain, the patient waking after several hours as from natural sleep. Unpleasant after-effects are occasionally observed. The reflex activity of the spinal centres is weakened, and this extending to the medulla causes paralysis of the respiratory centre. No effect is seen upon the sensory nerves, but the motor nerves are gradually affected, muscular weakness being one of the prominent phenomena attending chronic chloral poisoning. Chloral acts powerfully upon the heart, lowering and weakening its rate of movement through a local influence upon the ganglion and muscle (Wood). With this there is lowering of arterial pressure, aided by dilatation of the superficial vessels. When death is caused by chloral, the heart is arrested in diastole. The decided fall in the bodily temperature is probably secondary to the cooling of the blood by dilatation of the cutaneous blood-vessels. Dyspnœa may be produced by engorgement of the lungs, due to the weakened cardiac action and to the local enlargement of the pulmonary vessels. Death is produced by respiratory failure usually, although it occurs sometimes with such suddenness as to lead to the supposition that it is due to syncope from direct action upon the heart.

In a few cases, death appears to be due to some deleterious action upon the blood, resembling scurvy, as purpuric and scorbutic eruptions occur with swollen, ulcerated gums, great prostration, and collapse. We treat the first class of cases of gradual respiratory failure by stopping

* It derives its name from the first syllables of the substances from which it is made.

the remedy, with the administration of stimulants externally by friction, local warmth, and sinapisms, and internally by hot coffee, and artificial respiration, galvanism, etc., with physiological antidotes, such as atropine and strychnine. In the second class of cases, unfortunately, death occurs too quickly for the action of remedies; but hypodermatic injections of ether, atropine, or strychnine, with evacuation of the stomach by the pump and the introduction of hot alcoholic stimulants, might be serviceable in saving life. In the third class of cases, transfusion of blood might be required, or the administration of large doses of the tincture of the chloride of iron. Chronic chloralism, presenting symptoms of muscular weakness or paralysis, moral perversion, feeble heart, epileptiform convulsions, and delirium tremens, is relieved by prompt removal of the drug and the administration of tonics, especially nux vomica or strychnine. Animals poisoned with chloral hydrate recover if they are kept warm. In some cases an erythematous rash follows the administration of chloral, and desquamation of skin from the fingers around the extremities has been noticed.

An eruption from chloral is especially apt to occur in children, weak and cachectic patients, and those who suffer from disease of the nervous system, as hysteria, chorea, myelitis, or general paralysis. The commonest cause of such a rash, however, is the ingestion of alcohol at the same time with chloral.

This substance is removed from the system principally by the kidneys; it also escapes by the breath, to which it gives a peculiar odor.

It is probable that some of the serious effects following the administration of chloral are properly attributable to impurities in the drug. If the crystals have a pungent, acrid odor, they should not be used; recrystallized chloral hydrate should be preferred for medical use. Where the heart is seriously affected and its walls are thin and weak, chloral should, as a rule, not be given. It is also dangerous to use it freely in alcoholic subjects.

Therapy.—The antiseptic action of chloral is utilized in surgery, where 5-per-cent. solutions are used as stimulating dressings for suppurating wounds and foul ulcers. This solution also may be applied to parasitic skin affections (Tinea versicolor). It is also used to check itching in eczema and prurigo. In combination with other remedies, it is used as an anodyne and counter-irritant in neuralgia and rheumatism:

℞ Chloral., ... 3ij.
Lin. saponis, ... f℥iv.—M.

For application to pleurodynia, lumbago, etc., the combination of chloral and camphor may be used:—

℞ Camphoræ,
Chloralis, ... āā ʒj.
Misce et adde
Lanolini, ... f℥j.
M. For neuralgia.

In diphtheria a gargle of 2 per cent., followed by application of a 20-per-cent. solution, is said to cause prompt disappearance of the false membranes.

Two or three grains of chloral to the ounce of water has been successfully used as an injection in gonorrhœa. Garretson employs the following combination, containing chloral, with effect as an injection in gonorrhœa:—

℞ Chloralis,
Zinci sulphatis, ... āā gr. viij.
Aquæ dest., ... f℥viij.—M.

The principal symptom for which chloral is prescribed is insomnia from mental overwork, or occurring during the course of typhus or typhoid, in delirium tremens, in phthisis, or in the aged. In acute mania, especially that caused by alcohol, very large doses have been followed by the best effects. When injected (ʒi–ij) into a vein, general anæsthesia is produced, but this method has no special advantage, and presents some decided disadvantages. The restlessness and insomnia present in general paralysis of the insane are allayed by the administration of this remedy, and it is also beneficial in spasmodic affections, chorea, whooping-cough, asthma, uterine pains, strychnine poisoning, and tetanus. A dose of chloral at bed-time is useful in paralysis agitans, and may be able to ward off an attack of nocturnal epilepsy. Chloral affords relief in laryngismus stridulus. The hypodermatic injection of 5 to 10 grains of chloral hydrate, in combination with $\frac{1}{8}$ to $\frac{1}{4}$ grain of sulphate of morphine, is highly recommended in cholera morbus attended with collapse and in the algid stage of Asiatic cholera. If the patient cannot be made to swallow, an emulsion may be prepared with egg containing 1 or 2 drachms of chloral, and given per enema. This drug also acts as an antidote in cases of poisoning from physostigma and picrotoxin. In cases of undue arterial excitement, during the early stage of pneumonia or overaction of a hypertrophied heart, or in the increased arterial tension of Bright's disease, chloral judiciously used may be of service. It is given with much benefit in allaying the discomfort of sea-sickness. In congestive headache with insomnia a combination like the following is advantageous:—

℞ Chloralis, ... ʒj.
Morphinæ hydrobromat., ... gr. j.
Aquæ camphoræ., ... f℥ij.
M. Sig.: A dessertspoonful every two hours until relieved.

It has been found useful in scarlet fever by Wilson, who gives gr. i–ij in a little syrup of lactucarium and water every two or three hours for a child 5 years of age.

In tetanus 10 to 20 grains should be given every hour or two, according to the gravity of the case, gradually lengthening the intervals and afterward reducing the dose. In convulsions after labor, an enema containing 1 drachm of chloral should be thrown into the rectum, or 30 or 40 grains given by the mouth. In the convulsions of children, it is a very prompt and efficient remedy. In restlessness and insomnia, chloral may be very advantageously prescribed with potassium bromide, as—

℞ Chloralis, ... ʒiij.
Potassii bromidi, ... ʒv.
Syrup. lactucarii,
Syrupi aurantii flor., ... āā f℥ij.
M. Sig.: A dessertspoonful at bed-time.

For the relief of night-sweats of phthisis, 1 drachm may be dissolved in 3 ounces of dilute bathing-whisky and the patient's skin bathed with it. This is also a good application to prevent bed-sores.

The compounds of chloral with camphor, salicylic acid, and with carbolic acid, are useful as antiseptics, especially the latter, which is free from unpleasant odor and is anodyne as well as antiseptic.

Chloral Butylicum.—Butyl chloral hydrate, or croton chloral (*Dose*, gr. ii–xxx), is obtained by the action of chlorine upon acetic aldehyde and collected by distillation. It is the hydrate of trichlorbutylaldehyde, and is in the form of crystalline scales, having a pungent smell and a disagreeable, acrid taste.

The action is like that of chloral, but said to be less depressing to the circulation and heart. It is more anodyne, and is especially useful in neuralgia. Five grains are given every half hour in neuralgia of the face. Liebreich, who was the discoverer of this drug, praises it as a hypnotic in doses of gr. xv–xxx. Croton chloral gives relief in headache due to eye-strain, and Ringer has found it very beneficial in migraine. It has also proved serviceable in dysmenorrhœa.

The following combination is recommended in neuralgia:—

℞ Croton chloral., ... ʒij.
Spt. vini rectificat., ... fʒij.
Elix. guaranæ, ... f℥iij.
M. Sig.: A teaspoonful every half hour or hour.

Chloralamid, or chloramid, is a new hypnotic, prepared by a patented process by combination of 2 parts chloral hydrate and 1 part of formamide. At present it is said to cost about one-fourth as much as sulphonal. According to von Mering, the drug is useful in senility, neuras-

thenia, phthisis, and diseases not attended by much pain. Umpfenbach (*Therap. Monats.*, No. 10, 1890), from a number of trials of chloralamid in Andernach Asylum, reports that it is a useful hypnotic, but that it possesses the disadvantage that one can never reckon certainly upon its action. From chloralamid no ill effects upon the circulation or in the feelings of patients are observed (Reichmann), although vomiting may occur. The usual dose is 2 or 3 grammes (30 to 45 grains). According to Rabow, experiments upon animals show that 3 parts of chloralamid equal in efficiency 2 of chloral hydrate, which is just the proportion in which chloral exists in the combination, in which it does not appear to gain hypnotic effect, although possibly there is less action upon the heart and blood-vessels than when chloral is given alone. In the report presented by Dr. T. Lauder Brunton, Chairman of Committee on the Relative Utility of Different Hypnotics, especially with reference to the certainty of their action and the question of tolerance, chloralamid, in doses of 20 to 30 grains, produced better effects than sulphonal, and was followed by no bad result.* According to Langaard, however, this drug produces a decided reduction of blood-pressure, which is developed more gradually and is later in making its appearance than that due to chloral. He therefore advises caution in the use of the drug in diseases of the heart. Good results have been attributed to chloralamid in chorea.

Chlormethyl is highly praised by Débove† in cases of sciatica and other neuralgias.

CHLOROFORMUM VENALE (U. S. P.).—Commercial Chloroform.

Preparations.

Chloroformum Purificatum (U. S. P.).—Purified Chloroform. *Dose*, for inhalation, ♏xx–f℥j; internally, ♏x–xx.

Mistura Chloroformi (U. S. P.).—Mixture of Chloroform (chloroform, purified, 8; camphor, 2; egg-yelk, 10; and water, 80 parts). *Dose*, f℥i–iv.

Spiritus Chloroformi (U. S. P.).—Spirit of Chloroform (10-per-cent. purified chloroform). *Dose*, f℥ss–j.

Linimentum Chloroformi (U. S. P.).—Liniment of Chloroform (commercial chloroform, 40; soap-liniment, 60 parts).

Linimentum Aconiti et Chloroformi (N. F.).—Liniment of Aconite and Chloroform (tincture of aconite and chloroform, of each, 2 parts; soap-liniment, 19 parts).

Aqua Chloroformi.—Chloroform-Water (about gr. iij in f℥j). *Dose*, f℥i–iv.

Pharmacology.—Commercial chloroform is impure, only containing 98 per cent. of chloroform, and is used solely for pharmaceutical purposes, as a solvent, or for external application. Purified chloroform is "a heavy, clear, colorless, diffusive liquid, of a characteristic, pleasant, ethereal odor, a burning, sweet taste, and a neutral reaction." It is obtained by adding chloral hydrate to an alkaline solution, or by the action of chlor-

* British Medical Journal, July 26, 1890.

† Buffalo Medical and Surgical Journal, April, 1889.

inated lime upon ethyl oxide, or alcohol, and distillation. It is afterward purified by the addition of sulphuric acid, sodium carbonate, and lime, and re-distillation. Chloroform is only sparingly soluble in water, but mixes with alcohol and ether in all proportions. It is itself a remarkable solvent, dissolving most alkaloids, resins, gutta percha, caoutchouc, paraffin, iodine, bromine, fixed and volatile oils, etc. Chloroform is not inflammable, but when mixed with alcohol it may be burned, and chlorine gas will be evolved. Chloroform-vapor is much denser than atmospheric air and diffuses slowly. Chloroform is unfit for anæsthetic purposes unless it be absolutely pure and fulfills the tests of the pharmacopœia. "If 5 cubic centimetres of purified chloroform be thoroughly agitated with 10 cubic centimetres of distilled water, the latter, when separated, should not affect blue litmus-paper (absence of acids), nor test solution of nitrate of silver (chloride), nor test solution of iodide of potassium (free chlorine). If a portion be digested, warm, with solution of potassa, the latter should not become dark colored (absence of aldehyde). On shaking 10 cubic centimetres of the chloroform with 5 cubic centimetres of sulphuric acid in a glass-stoppered bottle, and allowing them to remain in contact for twenty-four hours, no color should be imparted to either liquid. If a few cubic centimetres be permitted to evaporate from blotting-paper, no foreign odor should be perceptible after the odor of the chloroform ceases to be recognized." The purified chloroform contains about ¾ to 1 per cent. of alcohol. It must be kept in glass-stoppered bottles in a cool and dark place.

Chloroform was discovered in 1831, by Mr. Samuel Guthrie, of Sackett's Harbor, N. Y., and about the same time by Soubeiran in France, and Liebig in Germany. It was first used as an anæsthetic by Sir James Y. Simpson, of Edinburgh, in 1847.

Physiological Action.—When kept in contact with the skin for some time, it causes irritation and, finally, vesication. After absorption, it exerts a sedative effect. Internally, it produces a feeling of warmth in the stomach and acts as a carminative, antispasmodic, and sedative; large doses are irritant. When introduced into the circulation, whether by absorption from the broncho-pulmonary mucous membrane during inhalation or by that of the stomach, the effects are the same. After a brief period of stimulation, the depressing effect of the drug is manifested, and in overdoses it is a cardiac poison, acting by destroying the contractility of the heart-muscle. Professor John A. MacWilliam, of Aberdeen, has demonstrated that, even when gently administered in moderate quantities and with a due admixture of air, chloroform causes an appreciable dilatation of the heart. This dilatation may precede the loss of the conjunctival reflex, and affects both

sides of the heart. It often occurs before any fall of blood-pressure. Artificial respiration, therefore, often fails to revive the patient because the enfeebled and distended heart is unable to maintain the circulation. The dilatation is not produced through the pneumogastrics, but is the direct effect of the drug upon the cardiac mechanism.* During anæsthesia the pupils are contracted. Dilatation of the pupils while the subject is fully under the influence of chloroform is an ominous sign. The anæsthetic should be immediately withdrawn and measures taken to invigorate the respiration and circulation and restore the patient to consciousness. Chloroform is eliminated by the lungs and the kidneys. It proves irritant to the kidneys as it escapes from the system. It generally kills in Europe and America by heart-paralysis, though, according to the recent report of the Hyderabad Commission to the *British Medical Journal*, in India it kills dogs by failure of respiration. It has no special effect upon the blood, unless the decided lowering of bodily temperature is to be attributed to its action upon the red blood-corpuscles, interfering with their function as oxygen-carriers to the tissues. Upon the nervous system the effects are very positive. Chloroform first affects the brain, then the sensory part of the spinal cord, then the motor tract, then the sensory parts of the medulla oblongata, and finally the motor portion of the medulla, thereby producing death from failure of respiration unless the heart has already succumbed to the drug (Hare).

Therapy.—Chloroform is used as a local sedative, antiseptic, and counter-irritant, and, owing to its solvent action upon the alkaloids, it is a useful vehicle for anodynes. The solution of gutta-percha in chloroform (liquor gutta-perchæ, U. S. P.) is sometimes used as a protective in small-pox and erysipelas. This is likewise a useful application in psoriasis, herpes zoster, superficial burns, furuncles, and fissured nipples. A lotion containing chloroform is often of service in urticaria, and a liniment made with chloroform, aconite, and camphor soothes the pain of neuralgia and chronic rheumatism:—

℞ Chloroformi,
Tinct. opii,
Tinct. aconit. rad., ... āā f℥ss.
Liniment. saponis, ... f℥iiss.
M. Sig.: For external application.

Chloroform may also be used, as suggested by Southworth, in the following combination to overcome a rigid perineum in labor:—

℞ Chloroformi, ... f℥ij.
Ætheris sulph., ... f℥j.
Spiritus odorat., ... Oj.
M. Sig.: Apply locally.

*British Medical Journal, October 11, 18, and 25, 1890.

This mixture acts quickly and well, large heads passing the perineum with no tear, which without it seemed impossible unless followed with extensive rupture.

Dobisch * recommends a combination containing pure chloroform as a spray for its local anæsthetic effect in minor surgical operations, incision of a paronychia, evacuation of a glandular abscess, extirpation of a superficial epithelioma, as follows :—

℞ Mentholi,	ʒj.
Chloroformi,	fʒx.
Ætheris sulph.,	fʒxv.—M.

The local anæsthesia lasts from two to six minutes.

Internally it is useful in gastralgia as chloroform-water, or in combination with anodynes, as in chlorodyne.† It has also been given in hysteria, asthma, irritable cough, and seasickness.

Chloroform-water has been found serviceable in spasmodic croup. A few drops of chloroform, taken in water or upon sugar, will often relieve vomiting when not due to inflammation of the stomach. In diarrhœa, spirit of chloroform is beneficially added to a mixture containing astringents and opium. The chill of intermittent fever may often be averted by the administration of a drachm of the spirit of chloroform. The same preparation, given alone or in combination with morphine, allays hiccough.

The microbicide action of chloroform makes it serviceable in some cases of flatulent and fermentative or infectious dyspepsia. It has even been claimed to be useful in cholera in this way, and might be serviceable in typhoid fever,—during the early stage, at least.

The spirit of chloroform is used with especial advantage in the treatment of cholera morbus, and often for its sedative action upon the system.

The spirit of chloroform can be advantageously combined and used with aromatics and other remedies.

* Allgemeine Medicinische Central-Zeitung, No. 14, 1890.

† CHLORODYNE.—The following formula is given by Oldberg and Wall as a good substitute for Collis Browne's chlorodyne :—

CHLOROFORMI MISTURA HYDROCYANATA (COMPOUND CHLOROFORM MIXTURE)

℞ Morphinæ sulphat.,		gr. iv.
Ol. menthæ piperita,		gr. viij.
Ætheris,		
Alcoholis,	āā	gr. cliv.
Acid. hydrocyanic. dil.,		fʒv gr. lxxxvj.
Chloroformi purificat.,		f℥iii gr. ccxxx.
Syrupi,	q. s. ad	f℥xvij.

Dose, ♏v-x.

℞ Spiritus chloroformi, ... f℥ss.
Aquæ camphoræ,
Spiritus ætheris comp., ... āā f℥ij.
Tinct. capsici, ... fʒij.

M. Sig.: A dessertspoonful in water, whenever necessary, for cholera morbus or in stomach-ache or intestinal pains or flatulence.

℞ Spiritus chloroformi, ... fʒv.
Creasoti, ... ♏vj.
Spiritus ammon. arom., ... fʒij.
Aquæ menth. pip., ... q. s. ad f℥v.

M. Sig.: A teaspoonful or two before meals for nausea or vomiting.

℞ Spiritus chloroformi, ... f℥ss.
Morphinæ sulphatis, ... gr. j.
Aquæ cinnamomi, ... q. s. ad f℥iv.

M. Sig.: From one to two teaspoonfuls every half hour for after-pains or in nervous or hysterical attacks.

In fevers, the spirit of chloroform is useful to relieve restlessness and irritative cough in pneumonia, bronchitis, or pleurisy, usually given in a "fever-mixture" combination.

Special Application.—The important application of this remedy is for producing anæsthesia during surgical operations. It is the most pleasant, the most active, and the most convenient anæsthetic. Unfortunately, its death-record is so much higher than that of its great rival, sulphuric ether, that most surgeons in this country prefer to use the latter, although its odor is not agreeable, and it requires a much larger quantity to produce unconsciousness, and it has a preliminary state of excitement or intoxication. (Remarks upon the state of anæsthesia and the choice of anæsthetics may be found on page 403 *et seq.*)

The Administration for Anæsthetic Effect.—The administration of chloroform for surgical operations requires skill and experience, and should never be intrusted to the hands of young graduates, whose attention is apt to be centred upon the operation instead of their duty. The greater number of fatal cases, by far, have occurred in the hands of those who did not appreciate the responsibility they assumed in using this powerful agent. To be forewarned is to be forearmed. Whereas deaths occur frequently in dental practice, where the operator tries to anæsthetize the patient and also to get ready to operate at the same time, the proportion of deaths in the hands of experienced anæsthetizers is very small, and hence the incredulity of some surgeons as to the greater danger of chloroform than ether. The method to be followed is, first, to eliminate all cases of weak or diseased heart; and, if the operation is to be a long one, requiring prolonged administration of the anæsthetic, cases of kidney disease must also be excluded. The patient

should not be in a sitting posture, nor should the chloroform be administered soon after a full meal. The clothing about the neck and waist should be loose enough to allow respiratory movements, but the patient should not be too much exposed, on account of the lowering of temperature and the possibility of congestion of the lungs or kidneys subsequent to the administration. The chloroform should be pure, and about 40 minims to a drachm poured upon a napkin or towel and held a little distance above the patient's nose and mouth, so that the dense vapor in falling shall mix with air.

According to Clover, the chloroform-vapor should be diluted with 20 volumes of air, and he has devised a special inhaler designed to accomplish this dilution. In many cases full anæsthesia, or coma, is not needed for small operations, parturition, passage of gall-stones, etc.; consciousness may be preserved while the sense of pain is abolished. Dr. Sayre, of New York, uses a much smaller amount of chloroform (5 to 20 drops), but administers the vapor in as concentrated a form as he can, avoiding the admission of air as far as possible, and speaks very confidently of the efficiency and safety of this method. The patient's pulse should be watched during the administration of chloroform, and, if it suddenly drops or becomes fluttering, Nelaton's method should be at once employed, in which the patient is placed in a vertical position, with the head downward, while artificial respiration is employed, which is usually successful. Nitrite of amyl or ammonia inhalations should also be practiced; or ether, digitalis, or whisky injected hypodermatically. Efforts at resuscitation should not be discontinued in less than one hour, as patients have recovered after artificial respiration had been continued for this length of time. The faradic current is likely to do more harm than good, as it interferes with other measures, and if applied to the phrenic nerve may cause stoppage of the heart by inhibitory action. Slapping the chest with the fringe of a towel wet with cold water was the favorite resource of the elder Gross.

From his studies upon animals, H. C. Wood is led to regard digitalis, hypodermatically injected, as by far the most valuable agent in combating the depressant effect of chloroform upon the heart. He also advises the conjoined use of strychnine on account of its stimulant influence upon the circulation, and particularly upon the respiration. He believes that small amounts of alcohol are valueless, while large quantities assist the paralyzing action upon the heart. When danger threatens, the angle of the jaw should be raised and the tongue drawn forward, so that no mechanical impediment shall be offered to free respiration.

In administering chloroform, it is important to gain the confidence

and co-operation of the patient, because struggling and resistance often disturb the judgment and lead to the employment of a larger quantity than is desired. Chloroform ought never to be administered rapidly, for the sudden entrance of a small quantity into the circulation is more dangerous than the gradual absorption of a larger quantity. In major operations, before the administration of the chloroform, it is customary with surgeons to give the patient 1 or 2 ounces of whisky as an arterial and cardiac stimulant. Chloroform is also often administered by inhalation for the relief of infantile and puerperal convulsions. The paroxysms of whooping-cough are checked or moderated by this agent. About $\frac{1}{2}$ drachm may be poured upon the hand of the mother and held near the child's nose, or it may be vaporized by means of hot water, 2 or 3 drops being used for each year of the child's age. Used in the latter manner, four times daily, it is said to shorten the paroxysmal stage. In severe cases of chorea, in which the convulsive movements interfere with deglutition and rest, chloroform inhalations answer a very good purpose by inducing sleep, which is followed by notable improvement. Administered at first three times a day, and less often as the symptoms improve, this plan is said to cure the disease, on an average, in twenty-eight days. Chloroform is of value in painful delivery, not given so as to produce unconsciousness, but merely to blunt the sensibility. Used in this way, the uterine contractions are not weakened nor the danger of post-partum hæmorrhage increased. Chloroform is better borne by women in labor than by any other class of subjects. But if pushed to anæsthesia the contractions become less vigorous and hæmorrhage is favored. It is asserted that the inhalation of chloroform for a few minutes at a time several times a day is beneficial in phthisis, relieving the cough and reducing the temperature. For this purpose, Fraser recommends also the hypodermatic injections of atropine (gr. $\frac{1}{120}$–$\frac{1}{60}$) with hydrochlorate of morphine (gr. $\frac{1}{12}$–$\frac{1}{8}$); for the latter Dr. Laborde substitutes narceine.* In sciatica, Bartholow has given deep injections of 10 to 20 minims of chloroform near the sheath of the nerve. In some cases this method has also afforded marked relief in facial neuralgia.

CHLORUM.—Chlorine.

Preparations.

Aqua Chlori (U. S. P.).—Chlorine-Water (0.4 per cent. chlorine). *Dose*, largely diluted, f℥i–v.

Calx Chlorata (U. S. P.).—Chlorinated Lime (25 per cent. of available chlorine) *Dose*, gr. iii–vj.

Liquor Sodæ Chloratæ (U. S. P.).—Solution of Chlorinated Soda (2 per cent.). *Dose* ♏x–f℥j, largely diluted.

* Therapeutic Gazette, September, 1890, p. 639.

Pharmacology.—Chlorine is a gaseous element, more than twice the density of air, of a greenish color, strong and suffocating odor, irrespirable and, even in a state of dilution, very irritating to the air-passages. For disinfecting purposes, it may be disengaged by adding hydrochloric acid to binoxide of manganese. Chlorine is soluble in water, and under the influence of sunlight slowly decomposes that liquid, combining with the hydrogen and setting the oxygen at liberty. Owing to the affinity for hydrogen, chlorine acts energetically upon organic substances, and often destroys them. Coloring matters of organic origin are bleached when exposed to its action. Chlorine is an efficacious disinfectant, decomposing hydrogen sulphide and destroying putrefying material. It also destroys the infectious miasms in the air, but should be in excess and in a closed room in order to be very effective. The generation of chlorine in the same room with patients is of very little use so far as disinfection is concerned. The combination with lime (chlorinated lime, or bleaching powder) is largely used for disinfecting drains and cess-pools.

For the sick-room, the solution of chlorinated soda (Labarraque's solution) is more convenient and less offensive, for use in commodes, bed-pans, etc., or for internal administration. The inhalation of ammonia gas is antidotal to chlorine when absorbed by the air-passages, chloride of ammonium resulting from their combination. In cases of accidental poisoning from swallowing a chlorine solution, albumin, in the form of milk, eggs, or flour, is the best remedy at our command.

Physiological Action.—Chlorine gas, in concentrated form, when directed upon the skin, causes smarting and redness, followed by erysipelatous or pustular inflammation. It is a disinfectant, destroying parasitic vegetable growths. The inhalation of dilute chlorine is irritating to the lungs and stimulates the end organs of the pneumogastric nerve, causing coughing and strangling sensations. Internally, chlorine was formerly given in various infectious diseases, but this is rarely done at the present day, although Labarraque's solution or (freshly prepared) chlorine-water has decided influence in maintaining the stomach in an aseptic state during low forms of fever.

Therapy.—In the form of solution, chlorine is used to clean offensive ulcers and to remove patches of pityriasis. This liquid is also an excellent disinfectant to sloughing wounds, and may be injected into abscess-cavities, sinuses, or fistulæ, for the purpose of removing and neutralizing unhealthy or decomposing pus. As an antiseptic wash, it may be employed in puerperal metritis. One part of Labarraque's solution to 10 or 12 of water is a useful injection in vaginitis. The same solution may be used as a prophylactic against poison from bites of serpents or insects.

Chlorinated oil*—that is, olive-oil saturated with chlorine—is a very efficient remedy in scabies. It acts without irritating the skin. In diphtheria the extemporaneous solution of Sir Thomas Watson is still used by some. It may be made by adding a drachm of hydrochloric acid to 10 grains of chlorate of potassium in a pint bottle, and, adding water gradually, shaking the bottle each time, until it is filled. This solution can be used freely for internal administration for its local and constitutional effects. Aqua chlori, or Labarraque's solution, may be similarly used, much diluted with water. The sore throat of scarlet fever is also benefited by the same methods. Gangrene of the mouth or tongue is likewise amenable to the same influence. The solution of chlorinated lime† of the British Pharmacopœia is one of the best antidotes to hydrosulphuric acid, ammonium sulphydrate, potassium sulphide, and hydrocyanic acid (given in doses of ♏xx–f℥j). Sheets wrung out of this solution may be wrapped around the body of a person dead of infectious disease or in a decomposing condition.

CHONDRUS (U. S. P.).—**Chondrus.** (Irish Moss.)

Pharmacology and Therapy.—Irish moss, or carrageen, is Chondrus crispus and Chondrus mammillosus (Algæ) bleached and dried by exposure to the sun. It is in hard, translucent, yellowish-white fragments of sea-weed, with characteristic odor and saline, mucilaginous taste. It contains iodine and bromine in small quantities; its principal constituent is mucilage, but it contains no starch. Boiled with milk and water (℥j in Oj) and properly sweetened with white sugar and flavored, it makes blanc mange; or, in more dilute decoction (ʒiv to Oiij), a demulcent drink for the sick. It has not much food value, but is deemed useful in bronchial affections.

CHRYSAROBINUM (U. S. P.).—**Chrysarobin.**

Dose, gr. ⅛–xx.

Preparation.

Unguentum Chrysarobini (U. S. P.).—Ointment of Chrysarobin (10 per cent., with benzoinated lard).

Pharmacology.—Chrysarobin is a mixture of proximate principles, commonly misnamed chrysophanic acid, extracted from goa-powder, a substance found deposited in the wood of the trunk of Andira araroba (Leguminosæ), a native of East Indies and Brazil. It is an orange-yellow powder, odorless and without taste, nearly insoluble in water and in alcohol, but soluble in ether, sulphuric acid, and solutions of alkalies.

* "Chlorinated Oil." See paper by the author, Medical Bulletin, 1884, p. 271.

† The strength of this solution is one avoirdupois pound of chlorinated soda to the imperial gallon.

Physiological Action.—In comparatively large doses (ʒss) it causes irritation of the intestinal mucous membrane, and gives rise to vomiting and purging, with large, bilious stools.

It excites inflammation of the skin from its local application, and produces a yellowish-brown stain of the skin and clothing. (The stain is removable with a weak solution of chlorinated lime or soda.) The dermatitis may be diffuse, or expressed by follicular and furuncular eruptions. Chrysarobin is parasiticide, and destructive to epiphytic organisms.

Therapy.—The principal use of chrysarobin is for its cathartic action. It has been administered internally, in doses of gr. $\frac{1}{8}$, several times daily in psoriasis. But its extremely irritant effect upon the intestinal mucous membrane so soon compels its abandonment that it is practically valueless as a systemic remedy. When applied externally for a considerable period, a small portion may probably act by absorption. Chrysarobin ointment should not be allowed to come in contact with the healthy skin, but, in psoriasis, the disease for which it has been principally employed, should be carefully rubbed into the affected area. The parts should then be covered by a bandage in order to protect the linen. Another method of applying chrysarobin is by making a paste of it by means of water, rubbing the paste upon the patches after the scales have been removed, allowing the mixture to harden and, finally, penciling collodion over the surface.

Chrysarobin is curative by its stimulating action on psoriasis, chronic acne, and vegetable parasitic skin diseases; but the officinal ointment should be diluted several times before application, for fear of exciting too much inflammatory reaction. Chronic eczema and the second stage of rosacea also receive benefit from chrysarobin ointment. The same preparation has sometimes proved of service in lupus vulgaris.

A very good combination in chronic eczema and psoriasis is the following:—

℞ Olei cadini,	fʒss.
Chrysarobini,	gr. xx.
Unguent. zinci oxidi,	℥j.—M.

CIMICIFUGA (U. S. P.).—**Cimicifuga, Black Snake-Root, Black Cohosh, Actæa.**

Dose, gr. xx–xxx.

Preparations.

Extractum Cimicifugæ Fluidum (U. S. P.).—Fluid Extract of Cimicifuga. *Dose,* fʒss.
Extractum Cimicifugæ.—Extract of Cimicifuga. *Dose,* gr. i–v.
Tinctura Cimicifugæ (U. S. P.).—Tincture of Cimicifuga (20 per cent.). *Dose,* fʒi–ij.
Decoctum Cimicifugæ.—Decoction of Cimicifuga (℥i–Oj). *Dose,* fʒvi–℥iss.
Macrotin.—An impure resin. *Dose,* gr. ss–ij.

Pharmacology.—The rhizome and rootlets of Cimicifuga racemosa (Ranunculaceæ), a plant common in woods in Northern United States, contain a neutral principle of acrid taste, soluble in dilute alcohol, water, chloroform, or ether. Its chemical nature is not known positively. Mr. Geo. H. Davis has discovered a volatile oil in the recently gathered roots; and Prof. Geo. B. Wood thought that this might be the active principle, since the drug deteriorates upon keeping. It also contains two resins. So-called cimicifugin, or macrotin, is an impure resin, deposited from the concentrated tincture upon the addition of water. There is also in the recent drug, besides the volatile oil, some tannic and gallic acids. The odor of the plant is rather fetid.

Physiological Action.—Cimicifuga has decided effects upon the human system. Small doses stimulate the digestive function and increase secretions along the alimentary canal. The secretions of the bronchial mucous membrane are also increased, the action of the heart stimulated, and the urine is augmented in quantity. The menstrual flow is increased, and some aphrodisiac qualities have been ascribed to the drug. Upon the heart and circulation an effect is noticed resembling that of digitalis, though less marked. Full doses slow the pulse and increase its force, raise arterial tension and stimulate uterine contraction; the latter action recalls that of ergot, though it is less powerful. Cimicifuga lowers the reflex activity of the spinal cord. The pupils are dilated; dimness of vision, vertigo, intense headache, nausea, and vomiting result from large doses. Even soporific effects have been observed, with relief from pain or spasm. Death may be caused by failure of respiration.

Therapy.—The applications of cimicifuga are in accordance with its physiological activity. Externally, a saturated tincture is said to relieve pain in rheumatism and neuralgia. In chorea it is of decided value, especially in weak, anæmic children. It is, moreover, very applicable to those cases which manifestly depend upon rheumatism, or to those which develop in girls at the age of puberty and are associated with menstrual irregularity. In neuralgia, especially when the consequence of rheumatism, cimicifuga is of undoubted benefit. In certain cases of sciatica improvement follows the administration of this agent. It was introduced into England by Sir J. Y. Simpson as a remedy for chronic rheumatism, myalgia, and hypochondriasis with depression. Cimicifuga is likewise serviceable in some cases of acute rheumatism, and Ringer has found it useful in rheumatoid arthritis. The fluid extract is the best and most reliable preparation. In uterine subinvolution, ovarian neuralgia, and amenorrhœa, it is highly commended. It has a good effect, also, in other constitutional manifestations dependent upon disorder of the female generative system, as, for instance, convulsions caused by disturbance of the

catamenial function, and in puerperal mania. Congestive dysmenorrhœa is likewise relieved by this remedy. By reason of its action upon the womb, cimicifuga may be employed during parturition as a substitute for ergot. Though not so powerful as the latter drug, it strengthens the normal uterine contractions. For its tonic effects, it is used in treating gastric catarrh and irritable stomach of alcoholism; also in delirium tremens and functional impotence. In weak and fatty heart it is safer than digitalis. On account of its stimulating effects upon the uterus, it should not be given during pregnancy.

In headache from eye-strain, cimicifuga has been given with benefit, and is especially useful in acute bronchitis as an expectorant. It may even be serviceably prescribed in phthisis, as it facilitates expectoration, sustains the appetite and digestion, and reduces fever.

Cimicifuga may be administered in the appended formulæ:—

℞ Ext. cimicifugæ fl.,	. . . .	f℥iss.
Tinct. nucis vomicæ,	. . . .	fℨj.
Tinct. cinchonæ comp.,	. . . . . . q. s. ad	f℥v.

M. Sig.: A teaspoonful or two in water every three or four hours. For ovarian and uterine neuralgia and amenorrhœa.

℞ Ext. cimicifugæ fl.,	. . . .	f℥j.
Morphinæ sulphatis,	. . . .	gr. j.
Spiritus ætheris nitrosi,		
Liquor. ammonii acetatis,	. . . . āā	℥ij.

M. Sig.: Two teaspoonfuls in water every three or four hours. For neuralgia, acute rheumatism, and acute bronchitis.

℞ Ext. cimicifugæ,	. . . .	gr. xxiv.
Ext. belladonnæ alc.,	. . . .	gr. j.
Pulv. capsici,	. . . .	gr. xij.

M. et ft. pil. no. xij.

Sig.: From one to two pills three times a day. For gastric catarrh, delirium tremens, and functional impotence.

CINCHONA (U. S. P.).—**Cinchona, Peruvian Bark.**
Cinchona Flava (U. S. P.).—Yellow Cinchona.
Cinchona Rubra (U. S. P.).—Red Cinchona.

Preparations of the Yellow Bark.

Infusum Cinchonæ (U. S. P.).—Infusion of Cinchona (6 per cent. of yellow cinchona when not otherwise specified, 1 per cent. sulphuric acid, and water). *Dose*, f℥ss–iij.

Extractum Cinchonæ (U. S. P.).—Extract of Cinchona. *Dose*, gr. i–x.

Extractum Cinchonæ Fluidum (U. S. P.).—Fluid Extract of Cinchona. *Dose*, ♏x–fℨij.

Tinctura Cinchonæ (U. S. P.).—Tincture of Cinchona (20 per cent.). *Dose*, ♏xxx–fℨij.

Preparation of the Red Bark.

Tinctura Cinchonæ Composita (U. S. P.).—Compound Tincture of Cinchona (cinchona 10, bitter orange-peel 8, serpentaria 2, glycerin 10, alcohol q. s. ad 100 parts). *Dose*, fℨi–iv.

Alkaloids and Salts.

Quinina (U. S. P.).—Quinine. A white, amorphous powder, soluble in 1600 parts water and in 6 parts alcohol. *Dose*, gr. i–ʒj.

Quininæ Sulphas (U. S. P.).—Sulphate of Quinine. *Dose*, gr. i–ʒj. In snow-white, loose, filiform crystals, fragile, and in a light, easily-compressible mass; lustreless (owing to superficial efflorescence), odorless, having a persistent bitter taste and neutral reaction. Soluble in 740 parts of water, and in 65 parts of alcohol at 15° C. (59° F.), in small proportions of acidulated water. Very slightly soluble in ether. Aqueous solution, especially if acidulated with sulphuric acid, has a vivid, blue fluorescence. When treated first with fresh chlorine-water, and then with slight excess of water of ammonia, the salt produces an emerald-green color (*thalleioquin*). Crystals are formed of the same color by treating an acidulated solution of quinine sulphate with saturated alcoholic solution of iodine (*herapathites*).

Ferri et Quininæ Citras (U. S. P.).—Citrate of Iron and Quinine (contains 12 per cent. of quinine, 88 of iron citrate). *Dose*, gr. ii–x.

Liquor Ferri et Quininæ Citratis.—Solution of Citrate of Iron and Quinine (contains 6 per cent. of quinine, 32 of iron citrate). *Dose*, ♏v–xv.

Vinum Ferri Amarum (U. S. P.)—Bitter Wine of Iron (contains solution citrate of iron and quinine 8, tincture sweet orange-peel 12, syrup 36, and stronger white wine q. s. ad 100 parts). *Dose*, fʒi–ij.

Quininæ Bisulphas (U. S. P.).—Bisulphate of Quinine. *Dose*, gr. i–xv. Similar to the sulphate, but much more soluble, dissolving in 10 parts of water or 32 parts of alcohol at 59° F.

Quininæ Hydrochloras (U. S. P.).—Hydrochlorate of Quinine. *Dose*, gr. i–xv. Soluble in 34 parts of water.

Quininæ Hydrobromas (U. S. P.).—Hydrobromate of Quinine. *Dose*, gr. i–xx.

Quininæ Valerianas (U. S. P.).—Valerianate of Quinine. *Dose*, gr. i–xx.

Cinchonina (U. S. P.).—Cinchonine. *Dose*, gr. v–xxx. White crystals, almost insoluble in water. Has an alkaline reaction. Tasteless at first, afterward bitter.

Cinchonina Sulphas (U. S. P.).—Sulphate of Cinchonine. *Dose*, gr. v–xxx. In white needles, soluble in 70 parts of water and in 8 parts of alcohol. Very bitter.

Cinchonidinæ Sulphas (U. S. P.).—Sulphate of Cinchonidine. *Dose*, gr. v–xl. Similar to preceding, but less soluble.

Quinidinæ Sulphas (U. S. P.).—Sulphate of Quinidine. *Dose*, gr. v–xxx. Similar to the preceding.

Chinoidinum (U. S. P.).—Chinoidine. *Dose*, gr. iii–xxx. A mixture of the alkaloids, in an amorphous form, and dark colored; obtained from the residue left from the manufacture of the crystallizable salts.

Quininæ Hydrochloras Carbamidata.—Double Salt of Quinine and Urea. Soluble in an equal part of water, and used hypodermatically in congestive chills. *Dose*, gr. i–x.

Quinetum, or Hospital Quinine, is the mixed alkaloids precipitated by an alkali; largely used as a febrifuge in India. *Dose*, about the same as quinine.

Cinchonidinæ Salicylas.—Salicylate of Cinchonidine. *Dose*, gr. ii–x.

Cinchonina Iodosulphas.—Iodosulphate of Cinchonine (50 per cent. iodine). A substitute for iodoform.

Pharmacology.—Cinchona is the most valuable contribution which the new hemisphere has made to medicine; one that is as universally known and prized as its two contributions to social economy and family life from the Solanaceæ,—the tobacco-plant and the potato. The pharmacopœia recognizes the bark of any species of cinchona (Rubiaceæ) con-

taining at least 3 per cent. of its peculiar alkaloids; but, of the many varieties of quinine-bearing trees, two are specifically mentioned: Cinchona flava, which is the bark of the trunk of Cinchona calisaya, containing at least 2 per cent. of quinine; and Cinchona rubra, the bark of the trunk of Cinchona succirubra, containing at least 2 per cent. of quinine. There have been isolated from cinchona-bark about twenty alkaloids, differing slightly in physical qualities, solubility, reaction, and affinities, but all possessing, to greater or less degree, the characteristic physiological actions of quinine. They may be divided into two groups: (1) quinine, quinidine, and quinicine; (2) cinchonine, cinchonidine, and cinchonicine. They exist in the bark combined with cincho-tannic, kinic, and kinovic acid, with a tasteless, inactive substance,—cinchona-red. While South America remains the principal source of cinchona, yet the cultivation of the tree has been successfully carried on in India and Java, and a considerable portion of the supply now is derived from this source. The constantly-growing demand for quinine has stimulated chemical investigation; and laboratory products, chiefly of the coal-tar series, are now offered in great variety, that closely approach the cinchona alkaloids in physical and chemical characters, and also have been proven valuable as antipyretics. Prominent among these are chinoline, antipyrin, acetanilid, resorcin, salicylic acid, naphthalin, which are considered separately under their individual titles. Thus far, however, no synthetically-prepared salt rivals quinine and cinchonine in their control over malarial manifestations, or in their tonic effects upon the system when given for a length of time in small doses. With regard to the comparative alkaloidal value of the bark, the C. calisaya contains the greatest proportion of quinine, the C. succirubra the greatest amount of tannin and coloring matter. Under the name of pale bark, the C. micrantha and C. condaminea were formerly officinal; they are intermediate between the two just named, in their alkaloidal value. The C. pitayensis, cuprea-bark, and other quinine-yielding barks are employed in manufacturing the alkaloids, but are not specifically named by the pharmacopœia; all are officinal which contain at least 3 per cent. of the peculiar alkaloids of cinchona.

Physiological Action.—The preparations of the bark are not fully represented by the salts of the alkaloids because they possess astringency, which is absent from the latter, and because the physiological action is increased by the association of different principles in accordance with the well-known rule of combination of synergistic remedies. The bulk of the powdered bark is inconveniently large, although the early victories of Jesuits' bark, as it was called, were made with the recent infusion, swallowed with the dregs,—a dose which modern patients

could scarcely be prevailed upon to take. In 1820, Pelletier and Caventou first isolated quinine, which has since taken the leading place in therapeutics of fever, and is second only to morphine in importance. As the other salts approximate more or less closely to this, we may omit consideration of their physiological action and simply take quinine as the type.

Quinine is a powerful antiseptic, and is very destructive to infusorial and vegetable life. A solution of 1 grain to the ounce destroys micro-organisms, and double this strength prevents fermentation and putrefaction. Upon the sound skin very little effect is produced, but upon a part denuded of epidermis or upon mucous membranes it is a decided irritant. It causes muscular contractions when applied directly to the muscle, but not when applied to a nerve (Eulenberg). It is therefore a muscle-irritant and not a nerve-irritant. Taken into the stomach, it exercises a local effect upon its contents, checking abnormal fermentation and destroying infectious micro-organisms. For this purpose it should be given in solution or in powder (capsule), so as to insure its solution in the stomach. In moderate doses, it stimulates the muscular fibres of the stomach, increasing its motor power, and also by its irritant action increases the secretion of gastric juice and, as a bitter tonic, improves the appetite. In larger quantities, hunger is abolished and the excess of irritant action causes arrest of gastric secretion. No influence has been noticed upon respiration and very little upon temperature of a person in health. In conditions of fever, the administration of several full doses reduces the temperature nearly to the normal; and there appears to be a tolerance during this condition, for the system can stand a much larger quantity at a dose than it can in health, without producing toxic effects. This may, in part, be due to the fact that absorption is checked by the fever. The effect upon the nervous system of small doses is best seen in cases of debility, where the agent acts as a tonic, invigorating the vital functions and aiding the digestion and assimilation of food. In larger doses, symptoms referable to the brain are noticed, such as fullness, frontal headache, deafness, ringing in the ears, and mental dullness. These symptoms are attributed to partial anæmia of the brain, owing to contraction of blood-vessels and lowered heart action, possibly to direct action upon the multipolar cells, analogous to the action of morphine. There is stimulation of the sympathetic and auditory nerves (Gubler). With deafness there is associated disturbance of vision or temporary blindness, due to extreme contraction of the arterioles and anæmia of the retina, the optic nerve being perfectly white, resembling white atrophy. This condition of the eye-ground is more or less permanent, but the function of vision is restored. Large doses lower or abolish the reflex excitability of the spinal cord. Soon after being introduced into the

stomach it diffuses into the blood and may be detected in the urine, elimination taking place slowly and lasting for several days. The quantity of urine is slightly increased in persons unaccustomed to its effects; the uric acid is decreased and urea not affected. In the blood, quinine arrests the migration of the white corpuscle and checks its amœboid movements; the red cells are rendered less adhesive and their oxygen-carrying function is impaired. It probably tends to destroy infectious micro-organisms in the blood and tissues. The pulse-rate is increased by moderate doses, but larger ones (ʒi–iss) cause lowering of the pulse and of arterial tension. In animals, death results from paralysis of respiration after large doses of quinine. In some patients various forms of eruption have been noticed upon the skin; even purpura * occasionally follows.

Poisoning.—The toxic symptoms produced by quinine and allied salts are spoken of collectively as **Cinchonism,** which ordinarily is not allowed to go farther than tinnitus aurium. Where these symptoms are annoying, or the patient is suffering with an overdose, the alimentary tract should be cleared by a purge and brandy and a cup of hot coffee administered, or a dose of ergot. Hydrobromic acid (fʒss–ij), given with quinine, prevents the occurrence of ringing in the ears or headache. Some patients show idiosyncrasy to the effects of quinine; urinary irritation, even congestion of the kidneys and hæmorrhages, may follow quite a small dose. Some, indeed, cannot take a single grain without great inconvenience from cinchonism. Where there is much irritation of the skin, urticaria, or erythema, a warm bath containing bicarbonate of sodium is useful; a hypodermatic injection of morphine may be necessary. Quinine is eliminated rather slowly and principally by the kidneys. It has also been detected in the sweat, saliva, and milk.

Therapy.—The application of powdered bark was formerly one of the accepted methods of treatment of ulcers, but is now obsolete. In hay fever, a spray of cocaine, followed by a spray of hydrochlorate of quinine (gr. vi–f℥j), used frequently, is highly recommended. A solution of quinine sprayed into the throat is attended with good results in diphtheria. Quinine has also been used as an injection in gonorrhœa for its antiseptic action. In a similar way, Garretson employs it as a paint in cases of erysipelas to limit the spread of the disease:—

℞ Quininæ sulphat.,	ʒij.
Tincturæ ferri chloridi,	f℥ij.
Tincturæ cinchonæ,	f℥j vel f℥iss.

M. Sig.: Apply with a camel's hair pencil. In using this preparation, the affected part is to be painted and repainted until it turns black. The application may have to be made from a dozen to fifty times. So long as redness of any surface or any point of a surface shows through the black, the cure is incomplete. The quantity of cinchona tincture used is graduated by the state of the skin; coarse skin requiring less, tender skin more.

* Cases by Dr. Frank Woodbury reported to State Medical Society of Pennsylvania. Philadelphia Medical Times, September 18, 1886.

In cystitis, irrigation of the bladder with a 2-per-cent. solution prevents decomposition of the urine. The hypodermatic injection of quinine is of great value in pernicious malarial attacks and in sun-stroke. The best salts for this purpose are the neutral hydrochlorate, the hydrobromate, or the carbamid-hydrochlorate, the solution being freshly made and filtered and a perfectly aseptic syringe being used, as otherwise abscess or septicæmia, or even tetanus, may follow.

As an ordinary tonic, in conditions of debility or convalescence, the tincture of the bark, either simple or compound (the latter being more astringent), is more useful than the alkaloids, for reasons already stated, and because the alcohol in the tincture is synergistic. The usual dose of either tincture is 1 or 2 drachms, as a tonic, and of quinine 2 grains, three times daily. In cases of diarrhœa, the antiseptic action of cinchona is very valuable, and quinine is of service in typhoid fever, especially during the second week; but it does not approach the character of a specific, as it does in malarial attacks. In ordinary chills and fever, 16 grains daily of the sulphate or bisulphate, or 12 of the hydrochlorate or hydrobromate, given in two or three doses, at least five hours before the time of the expected paroxysm, will generally prevent its appearance, or greatly modify it. The treatment should be continued for a week or ten days, diminishing the dose, or suspending it, if cinchonism appear, but resuming the full dose at septenary periods, after the appearance of the last chill, for a month or more. The following prescriptions may be used in malaria:—

℞ Quininæ sulphatis, ... ʒij.
Acidi sulphurici arom., ... fʒj.
Ol. menth. pip., ... ♏v.
Ext. glycerrhizæ fl., ... f℥j.
Glycerini, ... f℥iv.

M. Sig.: A teaspoonful or two every three or four hours.

℞ Quininæ sulphatis,
Ferri pyrophos., ... āā gr. xl.
Acidi arseniosi, ... gr. j.
Pulveris capsici, ... gr. xx.
Aloini, ... gr. ij.

M. et ft. pil. no. xx.
Sig.: A pill three or four times a day.

℞ Tinct. cinchonæ comp., ... f℥iv.
Tinct. nucis vomicæ, ... fʒj.
Extracti taraxici fl.,
Ext. cascaræ sagradæ fl., ... āā f℥ij.

M. Sig.: A half to a tablespoonful in water three or four times a day.

A patient once poisoned by malaria may find it necessary to take a course of quinine for several weeks each year, at the season when the

attack first appeared; and if unacclimated persons, wishing to stay in a malarious locality, or traveling through one at certain seasons of the year, will make use of the prophylactic action of quinine, they may escape infection by taking from 4 to 6 grains daily. Surgeon-General John B. Hamilton considers cinchonine preferable to quinine for this purpose. In children, as well as in adults having a weak or irritable stomach, it is more convenient to administer the remedy in suppositories of cacao-butter, on account of the bitter taste and unpleasant effects on the digestion. The taste of quinine is tolerably well disguised by milk, and, as Dr. F. E. Stewart suggests, by coffee prepared with milk and sugar, the dose to be followed by a sip of coffee which contains no quinine. Ringer states that an equal portion of powdered ginger conceals the taste of quinine. In enlargement of the spleen (ague-cake) quinine is very efficient in moderate-sized doses. In intermittent fever it is not given during the paroxysm, because its irritant action may increase the nervous disturbance; but in other fevers pyrexia is no contra-indication to its use. In infectious diseases, hæmorrhagic measles, small-pox, diphtheria, and pyæmia, quinine combined with alcohol is the chief reliance.

This drug quite favorably influences the broncho-pneumonia of measles and counteracts the tendency to caseous degeneration. Combined with iron, quinine is very serviceable in erysipelas. Ten grains of quinine, given with Dover's powder, opium, or morphine, is efficient in averting an attack of acute catarrh. The same quantity of quinine given at the beginning will sometimes abort acute tonsillitis and prevent the formation of pus. As quinine checks the principal phenomenon in inflammation and suppuration, which is the escape of the white blood-cell, and by preventing the exchange of oxygen by the red blood-cells reduces inflammation, it is especially serviceable in pneumonia and other localized inflammations, and also in reducing discharge from abscesses and preventing sapremia or pyæmia. Bartholow considers that a larger dose—from 20 to 40 grains—has the power, if administered during the congestive stage, before exudation has occurred, of suppressing a croupous pneumonia, pleurisy, or endocarditis.

In this country, quinine is rarely, if ever, given in doses of several drachms, as it has been in Germany, for the purpose of reducing high temperature in erysipelas, scarlatina, or rheumatism, although Liebermeister regards it as being a better antipyretic than the cold bath. It is not considered advisable to use such large amounts in typhoid, on account of the inflammation of the patches in the small intestine. In typhoid and other fevers it may be administered in the following manner, especially if the action of the heart be weak:—

℞ Extract. cinchonæ fl., ... f℥vj.
Tinct. cardamom. comp., ... f℥iv.
Spiritus ætheris comp., ... f℥j.
Tinct. digitalis, ... f℥ij.
Aquæ chloroformi, ... ad f℥x.
M. Sig.: A half to a tablespoonful every three or four hours.

In whooping-cough, which is regarded by some as a parasitic infection, its use has been attended by much benefit in comparatively large doses, conjoined with the local use of a spray of quinine solution (Henke).

In many disorders of atonic character, such as neuralgia, dyspepsia, night-sweats of phthisis, general debility, neurasthenia, quinine is highly serviceable. It is particularly valuable in those manifestations of neuralgia which result from anæmia or malaria, and is well combined in the former case with iron, and in the latter with arsenic, thus:—

℞ Quininæ sulphatis,
Massæ ferri carbonatis, ... āā ʒss.
Ext. nucis vomicæ, ... gr. iij.
Ext. belladonnæ alc., ... gr. j.
M. et ft. pil. no. xij.
Sig.: A pill three or four times a day.

℞ Quininæ sulphatis, ... ʒj.
Arsenici sulph.,
Ext. ignatiæ alc., ... āā gr. ij.
M. et ft. pil. no. xx.
Sig.: A pill three times a day.

Its stimulating effects have led to its common use by ladies, who have learned to take it as a "bracer" when going shopping. Dr. St. John Roosa has called attention to the dangers of the abuse of this drug, its causing many serious disturbances of the ear, even when taken in small, though long-continued doses. Many skin disorders and eruptions are due to malaria, as pointed out by the late Dr. L. P. Yandell, in which quinine produces good effects. In old malarial cases the sulphate of cinchonine or cinchonidine may be substituted for the more expensive quinine salts:—

℞ Chloroformi, ... ♏xxx.
Cinchonidinæ sulphas, ... gr. xlviij.
Tinct. cardamom. comp., ... f℥ij.
Mucilaginis acaciæ, ... q. s. ad f℥iv.
M. Sig.: Take a dessertspoonful every four hours, for malarial toxæmia.

℞ Chinoidini, ... ʒj.
Cinchonidinæ sulph., ... gr. xl.
Piperinæ, ... gr. vj.
Cupri sulphat., ... gr. ij.
M. et ft. pil. vel capsulæ no. xxx.
Sig.: One or two every three or four hours in congestive chills.

Other evidences of chronic malarial intoxication, as diarrhœa, dysentery, jaundice, and chorea, disappear under the administration of quinine. Intermittent hæmaturia, due generally to the same cause, is cured by large doses of quinine. Small doses of quinine, temporarily employed, are useful in cases of catarrh of the stomach, whether due or not to alcoholic excess. Its action is aided by association with a mineral acid. Quinine is an excellent remedy in aphthous ulceration consecutive to enterocolitis, and in the yeasty vomiting produced by the growth of sarcina ventriculi. The same agent is of utility in the treatment of ascarides and tænia, not by virtue of a direct toxic influence upon the parasites, but by correcting the unhealthy condition of the intestinal mucous membrane which favors their development. Tonic doses of quinine render excellent service in delirium tremens. The laryngismus stridulus to which rickety children are subject is ameliorated by the hydrobromate of quinine. In many skin diseases dependent upon lowered nutrition,—as, for instance, acne, impetigo, or ecthyma,—small, daily doses of this remedy are beneficial. Quinine is of value as a support to the system during the course of a prolonged suppuration; and a full dose is prudently given before the use of a catheter or bougie, in order to prevent the occurrence of a chill. It is an excellent tonic in bronchorrhœa. Good results have been claimed by certain French physicians from the use of quinine in acute rheumatism, but the experience of most observers is unable to confirm these reports. It is of more decided benefit in chronic rheumatism, especially when occurring in aged or debilitated subjects. In these cases it is best given in conjunction with the tincture of iron, or in the form of salicylate of quinine, or with iodide of potassium:—

℞ Quininæ sulphatis,	ʒj.
Tinct. ferri chloridi,	f℥j.
Elix. cascaræ sagradæ,	f℥iv.

M. Sig.: Two teaspoonfuls three or four times a day.

℞ Potassii iodidi,	ʒvij.
Spiritus chloroformi,	fʒij.
Tinct. cinchonæ comp.,	f℥x.

M. Sig.: A half to a tablespoonful in water three or four times a day.

Special Applications.—In obstetrics, quinine is valued as an oxytocic, increasing the energy of the uterine contractions, though not capable of inciting them. Abortion has been produced by the administration of quinine and strychnine as a tonic, the accident being attributable to the latter agent. Quinine is also useful in preventing putrid infection from the uterine discharges, in the treatment of so-called milk fever (a mild septicæmia) or milk-leg, and also in cases of uterine subinvolution after

parturition. In small doses it stimulates the menstrual flow and acts as an emmenagogue. In anæmic patients it may be given combined with iron:—

℞ Ferri et quininæ citratis, ... ʒj.
Ol. tanaceti, ... ♏x.

M. et div. in pil. no. xx.

Sig.: One four times daily, or two morning and night.

Warburg's tincture is highly prized in England in fevers, and in shock or collapse. Each ounce contains quinine, 10 grains, in combination with aromatics, half of the quantity being given at a dose and the remainder in three or four hours.* Its administration is to be preceded by a brisk purgative. In severe cases of poisoning by malaria, large doses are absolutely necessary to save life when given by itself, but when given in the above combination much smaller quantities are found to answer the purpose.

Iodosulphate of Cinchonine is the precipitate resulting from the addition of a solution of iodated iodide of potassium (Bouchardat's reagent) to a watery solution of the sulphate of cinchonine. It is collected and washed free from iodine, and dried. The resulting product is an amorphous, impalpable powder, of a brownish color, without odor, insoluble in water, though soluble in alcohol or chloroform. The dose of this preparation is from 1 to 5 grains. The interesting point in connection with it is that it contains 50 per cent. of iodine. M. Ivon (*Le Progrès Médicale*, July 12, 1890) has recently completed some studies upon the antiseptic qualities made with this agent, which, on account of its effects, he styles **Antiseptol,** and recommends as a substitute for iodoform on account of the low price and superiority as a surgical dressing.

Iodosulphate of cinchonine has the action of the two substances that enter into its combination, being at the same time free from the toxic effect which follows sometimes from the use of iodoform. Externally it has been used by the writer for its antiseptic action with excellent results, especially in the treatment of chronic ulcers, sinuses, abrasions, lupus vulgaris, abscesses, chronic acne, and various inflammatory thickenings of the integument. The following formulæ may be recommended:—

℞ Cinchoninæ iodosulphatis, ... ʒj.
Ungt. zinci oxidi, ... ℥j.

M. For chronic acne, eczema, and psoriasis.

* The National Formulary has the following formula for Warburg's tincture, under the name of *Tinctura Antiperiodica* (N. F.): Rhubarb, angelica-seed, āā gr. 56; elecampane, saffron, fennel, āā gr. 28; aq. extract of aloes, gentian, zedoary, cubeb, myrrh, white agaric, camphor, āā gr. 14; sulphate of quinine, gr. 160; dilute alcohol, q. s. ad Oj. M. *sec. art.* Or the formula may be prescribed *without aloes*.

℞ Cinchoninæ iodosulphatis, ... ʒj.
Ol. eucalypti, ... ♏x.
Lanolini, ... ℥j.

M. For syphilis, chronic ulcers, and eczema.

The author's attention has been directed to this preparation by Dr. Frank Woodbury, who has employed it largely in the treatment of consumption and many systemic affections in which antiseptics are indicated. It has been used with advantage in place of iodoform, iodol, or aristol, or in those cases in which these agents are not well borne. Woodbury has given from 1 to 5 grains of the drug in phthisis, three or four times a day, and the author has also administered similar doses with marked benefit in the treatment of scrofuloderma, lupus vulgaris, psoriasis, chronic eczema, secondary and tertiary syphilis. Iodosulphate of cinchona has both a tonic and an alterative action upon the system. At this time the author has several cases of the different diseases alluded to upon this drug, with a most decidedly good effect.

Dextro-Quinine is probably an impure quinidine (Wood).

Contra-Indications to the use of quinine consist in :—

1. Idiosyncrasy, where nervous disturbances, headache, skin eruptions, purpura, are caused by small doses, and where this cannot be overcome by the use of bromides, ergot, or arsenic.

2. Acute inflammation of the genito-urinary tract or congestion of the kidneys.

3. Acute inflammations of the gastro-intestinal tract.

4. Inflammation of the middle ear and dullness of hearing (nervous deafness).

5. Infants suffering with eczema.

The comparative antiperiodic value of the alkaloids is thus estimated by Bartholow: Quinidine is first as an antiperiodic; quinine comes next. Cinchonine requires about twice the dose in order to equal quinine. Cinchonidine is a little stronger than cinchonine. Amorphous chinoidine is about one-fourth the strength of quinine. As already stated, Dr. J. B. Hamilton prefers cinchonine sulphate as a prophylactic to quinine sulphate. In the United States Army the hydrochlorate is generally given the preference over the sulphate on account of its greater solubility. The hydrobromate and valerianate are supposed to cause less nervous irritation in susceptible subjects than the other salts. The addition of a few drops of dilute sulphuric acid to quinine sulphate makes it much more soluble; or, the disulphate may be prescribed in pill form in the same doses as the sulphate. The borate, carbolate, and salicylate of quinine have been introduced as especially serviceable in neuralgia, but possess no special advantages sufficient to compensate for their

higher cost. Quinine sulphovinate is a very soluble salt, requiring only twice its weight of water to dissolve it, and might be used hypodermatically.

Quininæ Tannas.—The tannate of quinine is sometimes called "tasteless quinine," because the bitterness is almost entirely overcome by the combination, largely because of insolubility of the salt. Although insoluble in water, it is soluble in the acid gastric juice, and when administered with food, or soon afterward, it answers equally well with the other salts. In the combination with sweet chocolate all objectionable taste is overcome, and, made into troches, or compressed tablets, each containing 1 grain, we have a sort of confection, probably the very best form in which to administer quinine to children. It may be made extemporaneously:—

℞ Quininæ,	gr. xxiv.
Acidi tannici,	gr. xij.
Syrupi cinnamomi,	f℥iij.

M. Each drachm contains one grain of quinine. If the quinine sulphate is used the tannic acid must be doubled.

℞ Quininæ hydrochlorat.,	gr. xxiv.
Acidi tannici,	
Glycyrrhizin. ammoniat.,	āā gr. xij.

M. Divide in chartæ no. xij.
Sig.: Three daily.

℞ Quininæ sulphatis,	gr. xxiv.
Elixir glycyrrhizin. ammon.,	f℥iij.

M. Sig.: A teaspoonful to a tablespoonful, according to circumstances.

The ammoniated elixir of glycyrrhizin is a good excipient for the sulphate which is suspended in the mixture. No acid should be added when the extract is used.

An adult can take a powder of quinine in a dessertspoonful of syrup of red orange, or syrup of wild cherry, without experiencing much unpleasant taste. Some prefer to take it in a little whisky and water. The sugar-coated or gelatin-coated pills are most commonly used, and. if properly made (and if they contain the full amount of the drug), they answer all ordinary demands. In cases of irritability of the stomach and diarrhœa it is better to use the remedy in the form of a solution.

CINNAMOMUM (U. S. P.).—**Cinnamon.**
Dose, gr. x–xxx.

Preparations.

Oleum Cinnamomi (U. S. P.).—Oil of Cinnamon. *Dose,* ♏i–iij.
Tinctura Cinnamomi (U. S. P.).—Tincture of Cinnamon. *Dose,* f℈i–iv.
Aqua Cinnamomi (U. S. P.).—Cinnamon-Water. *Dose,* f℥ss–iv.

Spiritus Cinnamomi (U. S. P.).—Spirit of Cinnamon. *Dose*, f℥i–ij.

Pulvis Aromaticus (U. S. P.).—Aromatic Powder (cinnamon, ginger, āā 35 parts; cardamom, nutmeg, āā 15 parts). *Dose*, gr. v–xxx.

Aromatic sulphuric acid, compound tincture of catechu, compound tincture of lavender, syrup of rhubarb, aromatic tincture of rhubarb, aromatic syrup of rhubarb, compound tincture of cardamom, chalk mixture, and wine of opium also contain cinnamon as a constituent.

Pharmacology.—Cinnamon is the inner bark of the shoots of Cinnamomum zeylanicum (Ceylon cinnamon), or the bark of the shoots of one or more undetermined species of Cinnamomum grown in China (Chinese cinnamon, or cassia), large trees belonging to the natural order Lauraceæ. Besides the volatile oil, which is used for flavoring purposes, cinnamon contains tannic acid, mucilage, coloring matter, an acid and lignin.

The Ceylon cinnamon is the choice variety, but the greater portion of this valued spice brought to this country is the cassia cinnamon, the flavor of which is less sweet and more pungent and astringent. The physiological properties are the same.

Physiological Action.—Cinnamon is an aromatic, with considerable astringency. It acts as a hæmostatic, not so much through its astringent constituents as by virtue of the volatile oil, which may be used efficiently alone.

Therapy.—In cases, especially among children, where counter-irritation is needed, the use of a spice plaster is recommended, as in croup, colic, neuralgia, etc. They can be obtained already prepared for use, or may be prepared extemporaneously by placing aromatic powder between two layers of flannel and moistening it with hot whisky. As a stomachic, in flatulence and feeble digestion, cinnamon is of some value, but its carminative effect is most frequently utilized in combination with other remedies, especially purgatives, to prevent griping. It is of service in diarrhœa, as in the chalk mixture, to which other agents may be added :—

℞ Bismuthi salicylat.,	gr. i–iij.
Misturæ cretæ,	f℥j.

M. pro dosi.

For irritative diarrhœa of infants, especially summer diarrhœa, this dose to be repeated according to urgency every hour or more.

It will at times be found capable of allaying nausea and vomiting, or even of relieving sea-sickness. In passive uterine hæmorrhage we may give an extemporaneous infusion in milk, or give the oil upon sugar. The oil may also be utilized, at least as an adjuvant, in pulmonary hæmorrhage.

COCCULUS—COCCULUS INDICUS.—Indian Berry, Fish Berry.

Preparations.

Extractum Cocculi Fluidum.—Fluid Extract of Cocculus. *Dose*, ♏i–ij.
Tinctura Cocculi.—Tincture of Cocculus (25 per cent.). *Dose*, ♏i–iv.
Picrotoxinum (U. S. P.).—Picrotoxin (the active principle). *Dose*, gr. $\frac{1}{120}$–$\frac{1}{60}$.
Unguentum Picrotoxini.—Ointment of Picrotoxin (gr. x–℥j of lard).

Pharmacology.—Cocculus Indicus is the fruit of Anamirta paniculata (Menispermaceæ), a native of the Malabar coast and of India. In 1812, Boullay discovered and isolated a peculiar bitter principle, which he denominated **Picrotoxin,**—a white, crystallizable, neutral substance, soluble in 150 parts of cold water, or in 25 of boiling, and very soluble in alcohol and ether, but not soluble in oils. Picrotoxin does not form salts. Like digitalin, picrotoxin appears to be made up of several bodies, which vary in their chemical properties and effects. Barth and Kretschy assert that it contains at least three: (1) picrotoxin, a bitter, poisonous principle; (2) picrotin, a bitter, non-poisonous principle; and (3) anamirtin. To these has been added cocculin (which is said to be identical with anamirtin). These pharmaceutical bodies may have scientific interest, but, practically, the prescriber is confined to the picrotoxin of Boullay, which is officinal in the United States Pharmacopœia. In the pericarp have been found menispermia, paramenispermia, hypo-picrotoxic acid, resin, fat, and gum, which do not possess much medical interest.

Physiological Action.—Cocculus, or picrotoxin, is very destructive to lower forms of life, and to many acts as an acrid, narcotic poison. In lower animals, death is preceded by convulsions, and in a fatal case of a child six years old, poisoned by absorption of a strong alcoholic solution of the fruit applied to the scalp, tetanic spasms occurred. Where this agent has been swallowed, the usual treatment, by evacuating the stomach, should be practiced, with inhalation of ether or ammonia and the internal administration of chloral or bromides. There is an antagonism between chloral and picrotoxin, and this can be utilized when poisoning has occurred from absorption through the integument.

In an article by William Murrell, of London, on "Picrotoxin and its Properties,"* this able authority states that the peculiar convulsions produced by this agent "differ essentially from the tetanic condition caused by strychnine, and are due to stimulation of the motor centres in the cerebrum, or in the medulla and cord. They assume various forms, the swimming, running backward, and moving round in a circle being the most common. Picrotoxin raises the temperature, stimulates the respiratory centre, and in large doses produces salivation." It acts as

*The Medical Bulletin, Nov., 1890, p. 402.

an anhydrotic by stimulation of the respiratory centre. "It is allied to **Cicutoxin**—the active principle of the water-hemlock—and to **Coriamyrtin,** derived from **Coriaria myrtifolia.** These drugs stimulate the origins of the inhibitory fibres of the vagus, the vascular and respiratory centres, and the motor areas of the medulla oblongata. In its action on the secretions, picrotoxin is allied to **Pilocarpine** and **Muscarine,** and is antagonized by atropine and other members of that group. The best antidotes to picrotoxin are chloral hydrate and bromide of potassium." On account of its poisonous effects, cocculus has been used from ancient times, made up into a paste and thrown into the water, where the fish are stupefied by it, and are easily captured. Death has occurred in a boy from eating a small quantity (40 grains) of such paste, but it is said that the flesh of the fish so taken is edible. This unsportsmanlike method of fishing in some parts of this country is illegal. On account of its bitterness, cocculus, or "fish berry," is sometimes added to malt liquor to save hops and check fermentation. Possibly this may enter into the solution of the problem of what is the matter with a man when he is drunk, and still further emphasize the importance of regarding intoxication as a condition of poisoning, demanding prompt, intelligent, and skillful treatment.

Therapy.—This is an ancient remedy for phtheiriasis, or lousiness, but care should be exercised in the case of children, or where there are abrasions on the scalp, not to use strong solutions, nor to leave them for many minutes in contact with the skin. The hairy scalp, after being thoroughly washed with soap and water, is wet with a solution (f℥ss of the tincture to f℥iv water), or decoction (℥j–Oj), and after a few minutes washed off with an abundance of warm water. Two or three daily applications are sufficient, especially in cases where the hair can be cut short, as in charitable institutions and asylums. It has been claimed that an ointment of picrotoxin is equally efficient with the decoction, but it cannot be regarded as being as safe. For the same reason, cocculus is not advised in the treatment of tinea and other skin affections, although still used for this purpose in India. A small quantity, however, of picrotoxin—not exceeding 1 per cent.—may be usefully prescribed, in combination with ointment of mercuric oleate, for the relief of animal and vegetable parasitic diseases, as scabies, pediculi, trichophytosis, and tinea versicolor.

In small doses it appears to act as a bitter tonic to the digestive tract, and has therefore been advised in atonic conditions of the stomach and intestinal indigestion attended by torpor of the intestinal walls, and constipation. In epilepsy, chorea, alcoholic tremor, paralysis agitans, and functional nervous disorders (migraine, dysmenorrhœa), picrotoxin

has been used successfully by Planat and Hammond, Gubler, Phillips, and others. There is good evidence in support of the statement made by Murrell as to its value in controlling night-sweating in phthisis in doses of gr. $\frac{1}{60}$, in a pill with sugar and tragacanth (a single dose, at bedtime, or given three times a day). It does not have the disagreeable action upon the throat and skin that atropine has, and frequently succeeds where that fails; but it is slower in producing its anhydrotic effect, requiring several days. Bókai regards picrotoxin as an excellent antidote to opium by reason of the stimulant action of the former substance upon the respiratory and vasomotor centres.

COCCUS (U. S. P.).—Cochineal.

Pharmacology.—The dried females of Coccus cacti (class, Insecta; order, Hemiptera), when crushed, produce a very brilliant red coloring matter; which consist principally of carminic acid, various salts, tyrosin, urea, fatty matters, etc. The pigment called **Carmine** is the coloring matter precipitated from the decoction by acids, and the salts of tin, or by gelatin; and other colors, such as lake, purple, and lilac, may be obtained by various reagents. It is highly prized in the arts as a coloring agent. As such it is also used in pharmacy, and is an ingredient in the compound tincture of cardamom.

Physiological Action.—The physiological reaction of cochineal is not very evident, but it is believed to have antispasmodic and anodyne qualities.

Therapy.—Cochineal was used by a preceding generation of physicians for whooping-cough (in gr. $\frac{1}{2}$ doses) and in neuralgia. Its color might lead to its use under the old doctrine of signatures.

COCILLANA.—Cocillana, Guarea.

Preparations.

Extractum Cocillanæ Fluidum.—Fluid Extract of Cocillana. *Dose,* ♏x–xx.
Tinctura Cocillanæ.—Tincture of Cocillana (25 per cent.). *Dose,* ♏xxx–f℥ij.

Pharmacology.—The Cocillana of Bolivia, a Guarea of undetermined species, is a large tree belonging to the Meliaceæ, of which the bark is used as an expectorant, having an influence upon the respiratory organs similar to ipecac, but "superior to it in certain diseases of the air-passages, in which the latter is often used" (D. D. Stewart).* It also has a tonic effect upon the digestive organs, and gives promise of usefulness as a laxative. It was discovered and brought to this country by the eminent botanist, Dr. H. H. Rusby, who also introduced pichi, another valuable South American remedy. The constituents of the bark

* Medical News, August 24, 1889.

have not been determined, but it is probable that it owes its effects to an active principle, resinous in character, soluble in chloroform (Schrenk), or perhaps an alkaloid (Rusby).

Physiological Action and Therapy.—In native medicine, cocillana is used as an emetic and cathartic. A free discharge of mucus, nausea and gagging, with some tendency to perspiration, also dizziness and lassitude, were caused in one case where 20 grains were given. Larger doses (gr. xxx–l) caused vomiting at the end of an hour, evacuations of the bowels, sneezing, and prostration, the effects resembling those of emetine. The active principle is excreted chiefly by the mucous membrane of the respiratory tract, upon which it acts as a stimulant.

This drug finds its special usefulness in bronchitis, particularly the subacute and chronic forms. The fluid extract is preferable to the tincture in acute bronchial attacks. It renders the cough less frequent and difficult, loosens and liquefies secretions, and facilitates expectoration, which it at the same time has the effect of reducing in quantity (Stewart).

CODEINA (U. S. P.).—**Codeine.**

Dose, gr. ¼–ij.

An alkaloid prepared from opium. It is more antispasmodic than morphine and has less narcotic effect.* It is used preferably in the treatment of cough, cramps in the stomach or bowels, and in neuralgia and painful affections of the genito-urinary organs. In diabetes it checks the formation of sugar, and in some cases permanently arrests it. In these cases it is borne well in larger amounts, as much as 10 to 15 grains daily having been taken with benefit. Fraser claims, however, that equally good effects may be obtained in smaller doses from the hydrochlorate of morphine, which is also very much cheaper.

COFFEA.—**Coffee.**

Preparation.

Extractum Coffeæ Viridis Fluidum.—Fluid Extract of Green Coffee. *Dose,* f℥ss–ij.

Pharmacology.—The seeds or berries of Coffea Arabica (Rubiaceæ) are only officially recognized as one of the sources of caffeine. Before roasting, coffee contains **Caffeine** and caffeo-tannic acid. During roasting a volatile oil is developed and several substances formed, which give to coffee its aroma and flavor, these empyreumatic substances being known collectively as **Caffeone.**

Physiological Action.—Coffee differs from caffeine in being more stimulating to the intestinal tract, especially increasing the peristaltic movements, which are not affected by caffeine. It produces a general

* Codeine, by Dr. Loewenmeyer, Deut. Med. Woch., Weekly Medical Review, November 29, 1890.

feeling of warmth and well-being, dilates the superficial blood-vessels, and lowers arterial pressure. It also stimulates the nervous system, in some persons causing exhilarating effects upon the cerebrum and increasing capacity for intellectual labor, and frequently is the cause of headaches in persons who take it habitually or in excess. A case has lately been reported* in which about 2½ ounces of the ground berries were made into a strong infusion and swallowed by a vigorous man. Two and a half hours later he was attacked by dizziness, severe cardiac pains, palpitation, nausea, vomiting, and generalized tremors. The tremors persisted for twelve hours after all other symptoms had disappeared.

Therapy.—It is valuable as a stimulant in cases of narcotic poisoning, especially by opium. In some cases it produces fullness of the portal circulation, interfering with the activity of the hepatic functions and causing hæmorrhoids. Its laxative effects are useful in persons leading sedentary lives, in preventing constipation. It has some astringent and antiseptic qualities, and is believed to have some effect in preventing malaria. The fluid extract of the unroasted coffee contains caffeine, but no caffeone. It is used in anæmic headache, and in cases of low fever as a cardiac stimulant where collapse is threatened. A solution of green coffee, prepared by macerating 6½ drachms over night, has been employed by Landarrabilco in nephritic colic and migraine.

COLCHICI RADIX (U. S. P.).—Colchicum-Root, Meadow-Saffron.

COLCHICI SEMEN (U. S. P.).—Colchicum-Seed.

Preparations from the Root.

Extractum Colchici Radicis (U. S. P.).—Extract of Colchicum-Root. *Dose*, gr. ss–ij.

Extractum Colchici Radicis Fluidum (U. S. P.).—Fluid Extract of Colchicum-Root. *Dose*, ♏ii–iv.

Vinum Colchici Radicis (U. S. P.).—Wine of Colchicum-Root (40 per cent.). *Dose*, ♏v–f℥ss.

Preparations from the Seed.

Extractum Colchici Seminis Fluidum (U. S. P.).—Fluid Extract of Colchicum-Seeds. *Dose*, ♏ii–v.

Tinctura Colchici (U. S. P.).—Tincture of Colchicum (15 per cent.). *Dose*, ♏v–f℥j.

Vinum Colchici Seminis (U. S. P.).—Wine of Colchicum-Seeds (15 per cent.). *Dose*, ♏x–f℥j.

Colchicina.—Colchicine (the active principle). *Dose*, gr. $\frac{1}{100}$–$\frac{1}{60}$.

Colchicum-root is the whole, or sliced, and dried corm of Colchicum autumnale (Melanthaceæ), or meadow-saffron, a native of the temperate parts of both Europe and Northern Africa, of which the seed is also officinal. It contains **Colchicine** (rather more in the seeds than in the root); and traces of **Veratrine** in combination with gallic acid and a fixed

* Therapeutische Monatshefte, March, 1890.

oil are found. The value of colchicum is tested by its bitterness, due to the presence of colchicine, an alkaloid, appearing in small crystals (Geiger and Hesse); is soluble in water and alcohol, but changed by most acids into **Colchiceine,** a neutral substance and a resin, both isomeric with colchicine. Wine and vinegar extract the medical principles from the drug, and the officinal extract is made with the aid of acetic acid. Probably each of them contains a small amount also of colchiceine. In ordering the wine, it is necessary to designate which preparation is required, as the wine of the seeds differs in effects from that of the root on account of the difference in content of colchicine, which is not entirely equalized by the pharmacopœial expedient of altering the proportion of crude drug in each. The fresh seed contains a small portion of volatile but very active oil, and the best preparation would be a tincture made from the fresh seeds in alcohol; but colchicine, when administered in granules, pill, or by hypodermatic injection, is said to secure the full therapeutic effect.

Physiological Action.—When applied to the skin, colchicum acts as an irritant, causing hyperæmia and smarting, and the dust inhaled causes sneezing and conjunctival injection. In small doses it occasions an acrid taste in the mouth, increased secretions from the salivary glands due to reflex action, and gastro-intestinal disturbance, which increases with the quantity taken. A single large dose or small ones long continued cause violent vomiting and purging (first serous, then mucous, then bloody), or acute gastro-intestinal irritation. Marked symptoms of collapse supervene; the pulse becomes small, rapid, and thready; the skin cold and bedewed with sweat; respiration slow and painful. Death ensues from collapse, the brain remaining clear to the last. Sometimes nervous symptoms, flying pains, and numbness, may appear, and occasionally, though rarely, convulsions (Brunton). Pains in the joints and urinary passages also may be produced by colchicum. A very large dose does not cause a more marked effect than a moderately large one. The action upon the alimentary canal is the same, whether the drug be swallowed or hypodermatically injected. When, during the administration of colchicum, there appear irritation of the fauces, loaded tongue, loss of appetite, flatulence, uneasiness, or pain in the stomach and diarrhœa, the drug is beginning to exercise toxic effects, and should be discontinued or suspended for a time. Colchicum has a selective action upon the sensory nerves and spinal cord, which are more or less paralyzed; the brain, motor nerves, and muscles are not affected. The inhibitory fibres of the vagus are paralyzed only by very large doses. The discharge of bile and of urine is largely increased; Rutherford claims that it is a true cholagogue, and Christison and others assert that it is diuretic, increasing

the quantity of salts as well as the water, both of which have been denied by Gubler, who simply regards it as cathartic, only exercising good effects when three or four discharges from the bowels are obtained daily through its action. When symptoms of poisoning make their appearance, the patient should be kept in a recumbent posture, encouraged to vomit, and allowed to drink freely of infusion of tea or coffee, on account of the tannin they contain as well as their action as arterial stimulants. Morphine and atropine may be administered hypodermatically in small doses. If there is much distress, sinapisms should be applied to the abdomen and the patient kept warm. Poisoning may occur in refilling prescriptions, as the preparations vary greatly in their activity; some samples of fluid extract contain very little, if any, of colchicine, while others are of standard strength.

Therapy.—Colchicum may be used in small doses as an ingredient in cholagogue pills, but its chief use is in the treatment of attacks of gout and in the relief of symptoms more or less directly attributable to gout, as dyspepsia, bronchitis, asthma, etc. In rheumatic arthritis or rheumatic gout, we may give :—

℞ Tincturæ colchici,	♏x.
Potassii iodidi,	gr. x.
Syr. sarsaparillæ comp.,	fʒiss.
Aquæ destillatæ,	fʒss.

M pro dosi. Take every three or four hours, well diluted.

℞ Vini colchici seminis,	fʒiv.
Sodii salicylatis,	ʒiij.
Sodii iodidi,	ʒj.
Spiritus chloroformi,	fʒiij.
Inf. buchu,	ad f℥viij.

M. Sig.: A tablespoonful every three or four hours.

Scudamore's gout mixture is also very good :—

℞ Magnesii sulph.,	℥ij.
Magnesii carbonatis,	ʒij.
Vini colchici seminis,	fʒvj.
Aquæ menth. pip.,	ad f℥xij.

M. Sig.: A tablespoonful every four hours.

Colchicum is generally given in acute attacks of gout, in combination with an alkali :—

℞ Magnesii sulphat.,	℥ss.
Magnesiæ,	ʒij.
Tinct. colchici,	fʒij.
Syrupi zingiberis,	f℥j.
Aquæ menthæ pip.,	f℥v.

M. Sig.: Take a tablespoonful every two hours, until the bowels are freely moved from four to six times in twenty-four hours.

Or the extract of the root may be given (gr. i–ij) several times daily, or the wine of the seeds in ½-drachm doses.

℞ Colchicinæ,	gr. ss.
Codeinæ,	gr. x.
Quininæ hydrobromatis,	ʒj.

M. et ft. pil. no. xl.
Sig.: Take one every two hours for gouty neuralgia.

The wine of the seeds is, perhaps, the preparation most frequently prescribed, and in an acute paroxysm of gout is best given in a moderately large dose (½–1 drachm). Within a few hours the pain is allayed, the heat and swelling begin to subside. In order to secure relief it is not necessary that the drug should manifest its diuretic or purgative effects. In chronic gout small doses (♏xv–xx) three or four times a day are appropriate. Though colchicum exerts an action which may be termed specific, it is nevertheless but palliative, since attacks recur. Of little or no value in acute rheumatism, colchicum is sometimes of service in the chronic form of the disease. Neuralgia dependent upon a gouty or rheumatic condition is often effectually treated by means of colchicum, a drachm of the wine being given at bed-time, together with a dose of sulphate of morphine. The same preparation is not infrequently serviceable in gonorrhœa, and 30 minims at bed-time is an old treatment for chordee.

Ch. Abadie has found very minute doses of colchicine (0.001 gramme $=\frac{15}{1000}$ grain) two to four times a day to be of great value in scleritis, whether due to gout or rheumatism.

F. Woodbury recommends its hypodermatic injection in sciatica, into the sheath of the nerves, and in muscular rheumatism.*

COLLINSONIA CANADENSIS.†

Preparations.

Cortex Collinsoniæ.—Powdered root. *Dose*, gr. x–lx.
Infusum Collinsoniæ.—Infusion of Collinsonia. *Dose*, f℥i–iv.
Extractum Collinsoniæ Fluidum.—Fluid Extract of Collinsonia. *Dose*, ♏–fʒj.
Tinctura Collinsoniæ.—Tincture of Collinsonia. *Dose*, ♏xx–fʒij.

Pharmacology.—This indigenous plant, belonging to the natural order Labiatæ, and popularly known as stone-root, or knob-root, grows from April to October in richly-wooded soils throughout the United States. All parts of the plant may be used, but its virtues reside chiefly in the root, and depend principally upon the presence of a volatile oil. It possesses a rank, aromatic odor, and a warm, somewhat pungent taste.

* Phila. Med. Times, vol. xiii, p. 154.
† See paper by author, in Transactions of the Ninth International Medical Congress, vol. iii, p. 76. Washington, D. C., U. S. A.

Physiological Action.—Collinsonia is a local astringent. It exerts a sedative effect upon mucous membranes, and produces a sensation of warmth in the stomach and bowels. Large doses give rise to diaphoresis, nausea, and, perhaps, vomiting.

Therapy.—Collinsonia is a good local application to incised or contused wounds. A drachm of the powdered root to an ounce of lard constitutes a stimulant application to indolent ulcers. The fluid extract, diluted with 4 parts of water and used as a rectal injection, effectually destroys ascarides.

This remedy, given internally, acts as an astringent tonic, antispasmodic and sedative. It increases the appetite, promotes digestion and elimination, and is therefore useful in anæmia, chlorosis, the early stage of phthisis, and in convalescence from the eruptive fevers. Relaxed uvula, chronic pharyngitis, and hoarseness due to impaired tonicity of the vocal cords are benefited by the local action of collinsonia. A cup of hot infusion at bed-time will abort an ordinary cold, or mild lumbago. The fluid extract is very beneficial to gastro-intestinal catarrh, whether dependent upon alcoholism or other cause. The remedy is especially useful in the former case, since it seems to lessen the desire for liquor.

Various spasmodic affections are relieved by collinsonia. The hot infusion is a useful remedy in spasmodic croup. In whooping-cough the paroxysms are ameliorated, and it is valuable in nervous cough and the irritative cough of pharyngitis. It is sometimes of service in chorea. Spasmodic contraction of the sphincter ani not uncommonly gives rise to constipation, hæmorrhoids, neuralgia of the rectum, with vague pelvic and abdominal symptoms. This spasm and the train of disorders dependent upon it may often be relieved by the employment every night of a suppository containing from 10 to 60 grains of powdered collinsonia-root. Some cases of dysmenorrhœa are markedly benefited by the administration of the fluid extract for a week preceding and during the period. It is probable that vaginal suppositories containing this remedy would be of service in vaginismus. Excellent results are obtained from collinsonia in renal and biliary colic. Spasm of the ducts is relaxed, and the irritation of the mucous membranes soothed. The increased flow of urine induced facilitates the expulsion of small calculi. Infantile colic and flatulent colic in adults are also amenable to the influence of this drug. In combination with aconite and morphine it is more rapidly efficacious than any other treatment of acute cystitis, and should be tried in chronic cystitis. Incontinence of urine in children and the dripping of a few drops of urine after the act of micturition is apparently completed, due to hyperæsthesia of the prostatic urethra or neck of the bladder, may be effectually relieved by the fluid extract. The writer has

seen it arrest the discharge of chronic gonorrhœa after the customary blenorrhetics had been exhibited in vain. It has likewise been found very beneficial in leucorrhœa and prostatorrhœa.

COLLODIUM (U. S. P.).—**Collodion.**

Preparations.

Collodium cum Cantharide (U. S. P.).—Cantharidal Collodion. External use.
Collodium Flexile (U. S. P.).—Flexible Collodion. External use
Collodium Stypticum (U. S. P.).—Styptic Collodion. External use.

Pharmacology.—Collodion is pyroxylon, or gun-cotton (4 parts) dissolved in stronger ether (70 parts) and alcohol (26 parts). Blistering collodion has cantharides (60 parts), exhausted by chloroform and evaporated (to 15 parts), to which is then added flexible collodion (85 parts). Collodion flexile is collodion (92 parts), to which Canada turpentine (5 parts) and castor-oil (3 parts) have been added. Styptic collodion contains tannic acid (20 parts) dissolved in alcohol (5 parts), stronger ether (20 parts), and collodion (55 parts). Collodion is a clear, syrupy fluid, smelling strongly of ether; and should be kept in a glass-stoppered bottle, tightly corked, remote from lights and fire. When painted upon a surface, the ether quickly evaporates, leaving a film of pyroxylon, which is adhesive and tends to contract or pucker up.

Therapy.—Collodion is used to cover excoriated surfaces and to seal small wounds. Larger wounds may be drawn together and kept in position by strips of gauze, the ends of which are made to adhere to the skin by several coats of collodion painted on with a camel's hair pencil. Sometimes it gives rise to pain, irritation, and even blistering when a comparatively large area is thus covered. The contraction caused by the drying of collodion is made use of in the treatment of the early stages of boils and styes, and the papules in small-pox, to prevent pitting. Where several coats are to be applied, the flexible collodion is preferable. It has also been used in herpes zoster and erysipelas, and the compression exerted by it has been utilized in the treatment of epididymitis, painting freely over the testicle and cord. A coating of collodion is likewise beneficial in the erythematous variety of burns. This substance is an exceedingly useful application to scalp-wounds, in which, besides approximating the edges and excluding the air, it does away with the necessity for a bandage. The pressure produced by the contraction of collodion has been successfully utilized in the treatment of umbilical hernia, varicocele, and spina bifida. In the nocturnal incontinence of urine in children it is often advantageous to seal the orifice of the urethra or the end of the prepuce with collodion. This method will not infrequently break up the habit within a few weeks. The styptic collodion may be used on cracked nipples, or for small wounds where an

astringent may be desired. Extract of cannabis Indica (2 parts), with salicylic acid (11 parts) in flexible collodion (87 parts), is a deservedly popular remedy for soft corns, under the name of the green solution for corns (collodium salicylatum compositum, N. F.). Iodine and iodoform have been used, dissolved in collodion, as an application to gouty or rheumatic joints, but the former sometimes exerts an unexpectedly caustic action, and has been followed by sloughing.

COLOCYNTHIS (U. S. P.).—**Colocynth, Bitter Cucumber.**
Dose, gr. ii–v.

Preparations.

Extractum Colocynthidis (U. S. P.).—Extract of Colocynth. *Dose,* gr. ii–iij.

Extractum Colocynthidis Compositum (U. S. P.).—Compound Extract of Colocynth. *Dose,* gr. iv–x.

The compound extract of colocynth contains aloes (100 parts), exhausted by alcohol and strained, to which are added colocynth extract (32 parts), resin of scammony (28 parts), and white castile-soap (28 parts). After thoroughly incorporating with the aid of heat (not above 275° F.), add cardamom in powder (12 parts), and when cold reduce the product to a fine powder. It should be kept in tightly-closed bottles. It is an ingredient in compound cathartic pill (comp. ext. of colocynth, gr. 1⅓; abstract of jalap, gr. j; calomel, gr. j; gamboge, gr. ¼; in each pill. *Dose,* i–iij).

Pharmacology.—The fruit of Citrullus colocynthis deprived of its rind, a native of Western Asia, but cultivated in various portions of the world (Cucurbitaceæ). The pulp of the fruit after separation of the seeds, which are inert, contains a yellow, either amorphous or crystalline, bitter, alkaloidal principle, **Colocynthin,** soluble in water and in alcohol; also a resin, **Colocynthein,** and **Colocynthitin,** the latter insoluble in water and not possessed of purgative effects, a tasteless crystalline body.

Physiological Action.—In small doses colocynth acts as a simple bitter, increasing the secretions and improving appetite. In larger doses it augments the flow of bile and acts powerfully as a drastic and hydragogue cathartic. Overdoses cause gastro-intestinal irritation, griping and purging. It is generally combined with other drugs to avoid this unpleasant action. Colocynth has some diuretic properties and indirectly acts as an emmenagogue.

Therapy.—Colocynth is a valuable purgative in chronic constipation or torpidity of the bowels. It produces soft, pulpy stools by stimulating peristalsis. Its griping tendency may be overcome by combining it with aromatics or a small proportion of hyoscyamus or belladonna:—

℞ Extracti colocynth. comp.,	ʒj.
Ext. belladonnæ alc.,	gr. ij.
Saponis,	gr. x.
Ol. cajuputi,	♏v.

M. et ft. pil. no. xx.
Sig.: Take one or two at night for habitual constipation.

In chronic dropsy of serous cavities, or cerebral congestion, the compound extract may be given with compound liquorice-powder. The compound cathartic pills are excellent for cases of *embarras gastrique*, or so-called biliousness. In chlorosis, colocynth is useful with iron.

CONDURANGO.—Condurango.

Pharmacology.—Of the several plants known in New Grenada under the name of condurango, the Condurango blanco is that which has the greatest medical interest from the remarkable claims that have been made for it. It is a vine stated to belong to a new genus of Asclepiadaceæ, and the name Pseusmagenuetus equatorium has been proposed for it.* The bark is separated from the stem by beating with a wooden mallet and afterward dried in the sun. It is from $\frac{1}{16}$ to $\frac{1}{8}$ inch in thickness; its external surface is smooth and of an ashy-gray color. It contains a yellow resin, extractive, tannin, etc.

Physiological Action.—To the resin the effect of the bark is ascribed, as it yields its virtues to alcohol. In the form of a decoction representing 2 or 3 drachms, however, it produces decided therapeutic effect. It has caused diaphoresis, increased secretion of urine, and even vertigo and disturbance of vision, with increased activity of the circulation. Brunton failed to find any therapeutic value in a specimen examined by him.

Therapy.—About a score of years ago condurango was brought to the notice of the profession as a specific for cancer, and especially gastric cancer, and reports were published of its wonderful cures in its native habitat. Having failed to fulfill the extravagant claims that were made in its favor, and no other use being then proposed for it, condurango was allowed to retire into obscurity along with its introducers. About four or five years ago, however, some prominent German clinicians—Ruhle, Binz, Immermann, and Riess—again directed attention to it, claiming that it was a good stomachic tonic; and in a large number of cases presenting symptoms of cancer of the stomach, in which the drug was used, the result was favorable. The remedy was not without success in a single one out of over a hundred cases. Riess administered a decoction (5 per cent.), of which 6 ounces are given every day, with syrup of orange-peel. Immermann advises the use of a wine of condurango as a good preparation. The tincture is a valuable remedy in gastric catarrh.

CONIUM (U. S. P.).—Hemlock.

Preparations.

Extractum Conii Fluidum (U. S. P.).—Fluid Extract of Conium. *Dose*, ♏i–v.

Abstractum Conii (U. S. P.).—Abstract of Conium. *Dose*, gr. i–iv.

Extractum Conii Alcoholicum (U. S. P.).—Alcoholic Extract of Conium. *Dose*, gr. ss–ij.

* United States Dispensatory, Wood, Remington, and Sadtler, p. 1628.

Tinctura Conii (U. S. P.).—Tincture of Conium (15 per cent.). *Dose*, ♏x–xxx.

Coniina.—Coniine (the active principle). *Dose*, ♏$\frac{1}{10}$–j.

Coniinæ Hydrobromas.—Hydrobromate of Coniine. *Dose*, gr. $\frac{1}{12}$–j.

Succus Conii.—Conium-juice expressed from fresh leaves and alcohol added (⅓ of the volume) to preserve it. *Dose*, f℥ss–ij.

Pharmacology.—The full-grown fruit of Conium maculatum (Umbelliferæ) gathered while yet green is officinal as hemlock; although the leaves are still used, they are less active, the seeds being about three times as strong. A tincture of the leaves (12½ per cent.) was formerly officinal (dose, f℥ss–j), but, like conium-juice, it is unreliable in strength, and should be abandoned in favor of preparations from the seeds. The habitat of hemlock is Europe and North America. It contains three alkaloids and both volatile and fixed oils. The most important alkaloid is **Coniine,** a colorless, oily liquid, alkaline in reaction, with an acrid, tobacco-like taste and a characteristic odor resembling the urine of rats. Coniine is soluble in alcohol; only very slightly so in water. It is very volatile, and easily decomposed by light or heat. It is most abundant in the nearly-ripe fruit of the plant in its second year. **Methyl-coniine,** another alkaloid, is associated with the preceding, and also **Conhydrine,** a crystallizable alkaloid, convertible into coniine by abstraction of the elements of one molecule of water. Their medicinal effects are less evident than those of coniine.

Physiological Action.—The local effects are sedative in painful conditions. No influence upon secretion has been noticed. Gastric disturbance results from a full dose of conium; nausea and vomiting appear early. Following this, there are staggering gait, weakness of the limbs, numbness, fatigue, ptosis, double vision, pupils slightly dilated, vertigo, lowered respiration, and labored speech. In poisonous doses there are loss of power of muscles, commencing in the lower extremities; loss of sight and of speech, and, finally, death from paralysis of respiration. The function of the sensory nerves is likewise impaired by excessive doses.

The heart's movements seem to be unaffected and the mind remains clear until the brain is overcome by accumulation of carbonic-acid gas in the blood. In a case of poisoning, the stomach should be emptied and coffee promptly given, with hypodermatic injections of atropine. Muscular exercise delays the action of the poison. Free counter-irritation by mustard would doubtless be serviceable. The physiological antagonists are strychnine, physostigmine, and atropine; tannic acid is incompatible. Upon the nervous system methyl-coniine acts slightly differently from coniine; the latter paralyzes the motor nerves from the extremities, gradually extending up to the motor centres; the former affects first the motor columns of the spinal cord. The sensory nerves

and muscular irritability remain unaffected. The excretion from the system of coniine is chiefly by the breath and the urine.

Therapy.—Poultices of the leaves of hemlock and flaxseed (2 of the former to 6 of the latter), with boiling water, have been used as a soothing dressing to painful swellings; they should be applied with caution where there are abrasions or ulcers. Conium possesses both anodyne and antispasmodic virtues, and has long been reputed to exercise a deobstruent influence upon glandular and other enlargements. A hemlock ointment, made by bruising the leaves with sufficient water, extracting and incorporating the juice with lard or other excipient, is an efficacious local remedy in painful maladies. It assuages the pain of cancer and may be beneficially spread upon irritable or painful ulcers and painful hæmorrhoids. It likewise affords relief when applied over the seat of pain in neuralgia, herpes zoster, chronic rheumatism, gout, or synovitis. The ointment is appropriately used in order to reduce the volume of enlarged scrofulous glands, enlarged mammary glands, liver, or spleen, and goitre. It may be spread upon the breast when the secretion of milk is excessive or requires suppression. In whooping-cough and asthma, hemlock ointment may be applied to the chest to assist the action of other remedies. Conium may be prescribed in form of ointment as follows:—

℞ Extracti conii alc.,	ʒj.
Cocainæ hydrochloratis,	gr. v.
Atropinæ sulphatis,	gr. j.
Veratrinæ,	gr. xx.
Ungt. aquæ rosæ,	℥j.

M. For neuralgia, chronic rheumatism, gout, and synovitis.

℞ Extracti conii alc.,	ʒj.
Mentholi,	gr. v.
Extracti belladonnæ alc.,	gr. x.
Ungt. zinci oxidi,	
Lanolin.,	āā ℥ss.

M. For painful cancer, scrofulous glands, herpes zoster, and enlarged mammary glands.

The vapor of coniine, or the fluid extract with hot water in an inhaler, yields good results in catarrh, laryngitis, irritative cough, and acute bronchitis, or the persistent cough of phthisis. The local hypodermatic injection of coniine has been employed in order to quiet the intercostal muscles in pleurisy and pneumonia; but the hydrobromate, being more permanent, is a better preparation. Other painful and spasmodic diseases have been benefited by the same method. Among these may be instanced angina pectoris, emphysema, asthma, acute mania, and tetanus. Dr. Harley warmly advocates the use of conium in chorea; also in nervous twitchings, blepharospasm, and post-hemiplegic tremor. In

various spasmodic affections of children, convulsions, spasm of the larynx, trismus, spasmodic wryneck, and whooping cough, it has also been much approved. In ovaritis and in dysmenorrhœa, its administration in the following prescription is frequently followed with great relief from the pain :—

℞ Succi conii,	fℨvj.
Potassii bromidi,	ℨiij.
Spiritus chloroformi,	fℨij.
Aquæ camphoræ,	ad f℥viij.

M. Sig.: From a half to a tablespoonful every two or three hours.

Conium has been highly recommended in paralysis agitans and hysteria. In acute mania, mania a potu, and active delirium tremens, it quiets motor excitement, finding, as it does, its principal usefulness in diseases attended by excessive motor activity. In some cases it is well to combine it with a little morphine for its effect upon the brain, and in others with bromide of potassium. Conium has been employed in epilepsy, but here it is inferior to the bromides. It may, however, prove of benefit in those cases marked by vertigo and disturbance of the cerebral functions. Walshe has known it to relieve the pain of gastric cancer. For the latter disease, as well as gastric ulcer, it may be used in this combination :—

℞ Tinct. conii,	fℨss.
Morphinæ sulph.,	gr. j
Acidi carbolici,	♏iv.
Syrup. acaciæ,	f℥iij.

M. Sig.: A teaspoonful whenever in pain.

Dr. Seguin, of New York, recommends rapid increase of the dose until physiological effects are noted. He gives a drachm of the fluid extract at a dose, and never less than 20 minims. Owing to the very volatile character of the coniine it is possible to administer large doses of some old fluid extracts without getting any effects whatever. If the strong, mousey odor is missing, the preparation will have very little therapeutic value. It is also said that preparations from cultivated plants, such as the succus, or tincture of the leaves, are apt to be inert. This explains the enormous doses used by Dr. Harley (f℥ss to f℥iij or iv) of the juice. It has been likewise noticed that children bear conium-juice well. Dr. Squibb calls attention to the possible danger following dilution of the fluid extract, by which a precipitate is formed, so that toward the end a poisonous dose may be accidentally taken. Death has been caused by the administration of 150 minims of the fluid extract. The poison administered to Socrates was apparently a strong, recent infusion of conium.

CONVALLARIA MAJALIS.—Lily of the Valley.

Preparations.

Extractum Convallariæ.—Extract of Convallaria. *Dose*, gr. v–xx.

Extractum Convallariæ Fluidum.—Fluid Extract of Convallaria. *Dose*, f℈ss–j.

Infusum Convallariæ.—Infusion of Convallaria (25 parts, in water 75 parts). *Dose*, f℥ss–ij.

Convallamarinum.—Convallamarin. *Dose*, gr. ¼–ij.

Pharmacology.—Convallaria majalis (Liliaceæ), a perennial plant, is native to Europe, Northern Asia, and our Allegheny Mountains. Its rhizome is about the size of a quill, its flowers bell-shaped and six-lobed. The flowers possess a fragrant odor and a bitter, acrid taste. All parts of the plant possess medicinal value, but its virtues reside principally in the flowers. Two glucosides have been isolated, known respectively as **Convallarin** and **Convallamarin**. The latter is the active principle of the plant, but seems to be unequally distributed in its different parts, and to be present in different proportions at different stages of its growth. A fluid extract, prepared from the root or flowers, is given in doses of 5 to 15 minims. A fluid extract of the entire plant is also made, the dose of which is from 10 to 30 minims.

Physiological Action.—Convallarin, in doses of 3 or 4 grains, acts as a purgative, but has no marked toxic effect. Convallamarin, in small doses, excites vomiting and manifests a special influence upon the action of the heart. At first the contractions are suddenly retarded and the blood-pressure increased; subsequently the cardiac pulsations are quickened and arterial pressure further augmented. Finally, the beat is arrested. Death takes place within a few minutes after introduction of the poison. The reflex function of the cord is abolished; otherwise the action of the nervous system seems but slightly affected.

Therapy.—In small doses this drug strengthens the heart's action; in larger quantities it restrains excessive cardiac activity. It has been found of especial value in mitral insufficiency. It quickly relieves the dyspnœa and palpitation, and, after having been given for two or three days, may be discontinued for a week or more without recurrence of the symptoms. Convallaria seldom disagrees with the stomach, and no cumulative action has been observed. It increases the secretion of urine, and, after compensation has failed, invigorates the organ and reduces œdema. In disease of the aortic valve, though of some service, the value of convallaria is less marked. In angina pectoris and various forms of functional heart disease this remedy has proved beneficial. In chronic Bright's disease it strengthens the circulation, relieves dyspnœa, increases the flow of urine, reduces dropsy, and lessens the albuminuria. Good results have also followed its administration in cardiac debility

due to pneumonia or typhoid fever. In some cases of idiopathic asthma it relaxes the spasm of the arterioles. It sometimes is serviceable in tic douloureux and other forms of neuralgia, insomnia, and the restlessness of fever. The palpitation and dyspnœa of phthisis are mitigated by the use of convallaria. It is of utility, likewise, in the irregularity of the heart dependent upon acute pneumonia, bronchitis, or emphysema, but is ineffective in fatty degeneration of the heart.

℞ Extr. convallariæ flor. fld.,		f℥ij.
Syrup. aurantii,	q. s. ad	f℥ij.

M. Sig.: A teaspoonful to a tablespoonful three times a day. Useful in mitral insufficiency and functional heart disease.

℞ Potassii bitartratis,		f℥ss.
Extr. convallariæ flor. fld.,		f℥iss.
Syr. simplicis,	q. s. ad	f℥iv.

M. Sig.: From one-half to a tablespoonful, in water, three or four times a day Valuable in general dropsy from heart or kidney disease.

COPAIBA (U. S. P.).—Copaiba.

Preparations.

Massa Copaibæ (U. S. P.).—Mass of Copaiba (copaiba 94, magnesia 6 parts). *Dose*, gr. x–ʒss.

Oleum Copaibæ (U. S. P.).—Oil of Copaiba. *Dose*, ♏v–x.

Resina Copaibæ (U. S. P.).—Resin of Copaiba. *Dose*, gr. viii–xv.

Pharmacology.—Copaiba is an oleoresin obtained from Copaifera Langsdorffii and other species of Copaiferæ (Leguminoseæ), coming principally from Brazil. It is not a balsam. In physical character it is a clear, transparent, oily liquid, of a pale-straw color and a characteristic unpleasant odor and taste. It contains a large quantity of volatile oil (the best specimens, 70 to 85 per cent.), in which two resins are dissolved. **Copaibic acid,** the principal one of the resins, is crystallizable, with faint odor and bitter taste; insoluble in water, easily soluble in absolute alcohol and in ammonia. Both the oil and the resin are medicinally active.

Physiological Action.—Locally applied, copaiba is slightly stimulating to the skin and mucous membrane. The taste of copaiba is peculiarly disagreeable, and it imparts its odor to the breath, being partly excreted by the bronchial mucous membrane. It is heating and irritating to the stomach, causing offensive eructations and frequently exciting vomiting and purging. Taken in medicinal doses, it soon interferes with the digestion, causing loss of appetite, disordered bowels, and diarrhœa. Copaiba is very diffusive, and stimulates secretion at its points of elimination by the kidneys, bronchial mucous membrane, and skin. Its special action is upon the mucous membrane of the genito-urinary tract, and in large amounts it gives rise to irritation or inflammation of the

kidneys, in its discharge through these organs. Bloody urine, pain in the bladder, and strangury are occasional results of the administration of copaiba. It acts locally upon the genito-urinary tract, at first stimulating and subsequently checking secretions. The resin has a decided diuretic action and is also expectorant.

Therapy.—Copaiba has been used for its stimulating and antiseptic effects in chronic skin diseases, psoriasis, lupus, and leprosy, being in its action very much like gurjun-oil. It can be used with benefit in old ulcers, and in thickened and irritable conditions of the tongue, mouth, rectum, vagina, uterus, and the urethra. Copaiba, applied to the urethra in gleet, is sometimes followed with a complete removal of the discharge:

℞ Copaibæ, ... ʒss.
Liq. boro-glycerini (50 per cent.), ... ʒss.
M. Sig.: For application to the urethra with bougie or camel's hair brush.

Internally, it is also given in the treatment of psoriasis, and for this purpose it is best administered in capsules, one or two hours after meals. For bronchitis, given as an expectorant, and in dropsy, for its diuretic effect, it is better to use the resin, which is nearly free from the objections to the volatile oil of causing offensive eructations. In bronchitis its effects are more decided after subsidence of the acute stage, and it is particularly valuable in chronic bronchitis associated with dilatations of the tubes and marked by a profuse purulent discharge. In ascites and some kidney disorders the resin is a valuable means of increasing the urine. Copaiba is of service also in cardiac dropsy. The remedy is not, however, invariably successful in removing these transudations, even when the conditions are apparently the same. Ringer concludes that this difference depends upon individual peculiarity, and adds that, whereas copaiba may cause bloody urine, he has seen a large amount of blood in the urine quickly disappear when copaiba was administered. The oleoresin is principally used as an antiblennorrhetic in gonorrhœa, after the acute stage has passed, and in cystitis and pyelitis. It may be given in combination with cubebs, or in the well-known **Lafayette Mixture** (mist. copaibæ comp., N. F.):—

℞ Copaibæ, ... f℥ij.
Tr. lavandulæ co., ... f℥ij.
Liq. potassæ, ... fʒiv.
Spiritus ætheris nitrosi, ... f℥ij.
Syrupi, ... f℥v.
Mucilaginis, ... q. s. ad Oj.

M. To be well agitated when used (each fʒ = ♏viiss). Dose, a tablespoonful taken after meals.

To each dose of the above, 3 to 5 drops of oil of sandal-wood may be added, with good results.

Among the many combinations of copaiba found of service in gonorrhœa and gleet, the author suggests the following:—

℞ Resinæ copaibæ,	ʒiiss
Oleoresinæ cubebæ,	fʒj.
Saloli,	ʒiij.
Pepsinæ pur.,	gr. xl.

M. et ft. capsulæ no. xl.
Sig.: From six to ten a day.

℞ Resinæ copaibæ,	ʒiv.
Acidi sulphurici arom.,	fʒij.
Acaciæ,	q. s.
Infus. rosæ,	f℥viij.

M. Sig.: A tablespoonful three or four times a day.

℞ Resinæ copaibæ,	℥ss.
Extracti glycerrhizæ fl.,	f℥j.
Spiritus ætheris nitrosi,	f℥ss.
Acaciæ,	q. s.
Aquæ cinnamomi,	ad ℥viij.

M. Sig.: A tablespoonful three or four times a day.

℞ Olei copaibæ,	
Oleoresinæ cubebæ,	āā ♏lxx.
Aloini,	
Extracti belladonnæ alc.,	āā gr. j.
Ol. menth. pip.,	♏j.

M. et ft. pilulæ no. xij.
Sig.: From three to six pills a day.

It is safe to begin the administration of copaiba in gonorrhœa as soon as the initial severity of the attack has subsided and the bowels have been freely opened. In the chronic cystitis of women, Dr. Whitla has derived great benefit from injection into the bladder of equal parts of copaiba and warm castor-oil. One ounce of this mixture is injected and allowed to remain until expelled. In the gonorrhœa of females, an emulsion of copaiba is sometimes used as an injection. In certain affections of the intestinal tract this remedy is sometimes of service. Chronic diarrhœa and dysentery may improve under the administration of copaiba after other agents have failed. It may prove beneficial in chronic intestinal catarrh accompanied by ulceration, and is recommended by Allingham in chronic proctitis. Clark and others have found it useful in pseudo-membranous enteritis, given in the intervals between paroxysms. It has been used successfully in the treatment of hæmorrhoids, 20 drops being administered in capsules four times a day, or $\frac{1}{2}$ drachm in combination with 15 drops of liquor potassæ, taken three times a day.

When nitric acid is added to the urine in making Heller's test for albumin, a cloud is formed if copaiba has been taken, but the application of heat causes it to disappear, and thus proves that it is not albumin

During the administration of copaiba, a coarse, measly rash sometimes breaks out over the body, especially in persons with a delicate skin; it also causes annoying itching. The administration with an alkali renders this accident less likely to occur. The mass of copaiba (pilulæ copaibæ, Ph., 1870) was introduced with this object in view; but it is less efficient therapeutically than the other preparations. It may be made into pills of gr. iii–x, sugar-coated.

COPTIS.—Coptis, Gold Thread.

Preparation.

Extractum Coptidis Fluidum.—Fluid Extract of Coptis. *Dose*, f℈ss–j.

Pharmacology.—The Coptis trifolia, or gold thread (Ranunculaceæ), is a native of the temperate portions of North America and the Old World. The entire plant is used, and was formerly officinal. The rhizome is thread-like, and of a bright-yellow color. It is bitter to the taste, without odor. Its constituents are **Berberine,** a white alkaloid, **Coptine,** resin, but no tannin.

Physiological Action and Therapy.—On account of the berberine principally, coptis is a pure, bitter tonic, agreeing well with the stomach, and without astringency. It is used to increase appetite, and as a general tonic. Locally, the infusion has been employed in aphthous ulceration of the mouth, and is a good gargle in ulcerative tonsillitis. The effects of berberine are discussed below.

The East Indian variety, Coptis teeta, of which the root only is employed in medicine, contains a very large proportion of berberine,—more than any other plant known.

A prescription containing gold thread, of much value in the treatment of dyspepsia, especially when attended with diarrhœa alternating with constipation, is:—

℞ Extracti coptidis fl.,	f℥ij.
Tinct. nucis vomicæ,	f℈j.
Aquæ cinnamomi,	f℥viij.

M. Sig.: From one-half to a tablespoonful before meals.

Berberine is an alkaloid found in numerous plants (berberis, coptis, columbo, hydrastis, menispermum, podophyllum, xanthorrhiza, xanthoxylum, etc.), belonging to the natural orders Berberidaceæ, Menispermaceæ, and Ranunculaceæ. It occurs in yellow, prismatic crystals, soluble in hot water and in alcohol, but insoluble in ether. It yields bright-yellow, crystallizable salts, of which the hydrochlorate and sulphate are employed in medicinal doses of gr. ii–x. It is a bitter tonic, antipyretic, and antiperiodic, also cholagogue. It is useful in dyspepsia, malaria, and diarrhœa.

CORIANDRUM (U. S. P.).—**Coriander.**

Dose, gr. v–xxx.

Preparations.

Coriandri Extractum Fluidum.—Fluid Extract of Coriander. *Dose*, x–xxx.
Oleum Coriandri (U. S. P.).—Oil of Coriander. *Dose*, ℳi–v.
Confectio Sennæ (U. S. P.).—Confection of Senna (coriander, 6 per cent.).

Pharmacology.—Coriander is the fruit of Coriandrum sativum (Umbelliferæ), native of Southern Europe. They sometimes are improperly called seeds. They have an agreeable, spicy odor, due to a volatile oil. The fruit also contains fixed oil.

Therapy.—This agent is used as an aromatic and stomachic, and is usually employed to prevent griping from other remedies, or as a flavoring excipient. A few drops of the oil may be given upon sugar for the relief of colic.

CORNUS (U. S. P.).—**Cornus, Dogwood.**

Preparations.

Extractum Cornus Fluidum (U. S. P.).—Fluid Extract of Cornus. *Dose*, f℥ss–j.
Extractum Cornus Floridæ.—Extract of Cornus Florida. *Dose*, gr. i–v.

Pharmacology.—The bark of the root of Cornus Florida (Cornaceæ), a small tree indigenous to the United States, has decided physiological properties. It contains a crystallizable, bitter principle, **Cornin,** or cornic acid; also tannic acid, resin, etc. As the active principle is altered by air and heat, a decoction or aqueous fluid extract is not an eligible preparation in order to obtain the effect of the drug. Cornin is found also in other species of dogwood, Cornus circinata, Cornus sericea, etc.

Physiological Action and Therapy.—Cornus belongs to the class of vegetable bitters, and is used as a stomachic tonic to increase appetite, etc. It has also considerable reputation for control over malarial manifestations, and is considered the best substitute for cinchona among the native astringent bitters.

CORYDALIS (U. S. P.).—**Corydalis, Turkey Corn.**

Preparation.

Extractum Corydalis Fluidum.—Fluid Extract of Corydalis. *Dose*, ℳxv–f℥j.

Pharmacology and Therapy.—The Dicentra Canadensis (Fumariaceæ), a native of the northern part of this country, has some reputation as an alterative, especially used as a tonic in syphilis and other conditions of debility. The tubers are the part of the plant used; they contain an alkaloid, **Corydaline,** combined with **fumaric acid,** also acrid resin and bitter extractive. Corydaline has been given in doses of 1 to 5 grains.

COTO CORTEX.—Coto Bark.

Preparations.

Pulvis Coto Corticis.—Powder of Coto Bark. *Dose*, gr. v–xxx.
Extractum Coto Corticis Fluidum.—Fluid Extract of Coto Bark. *Dose*, ♏xii–xxx.
Tinctura Coto Corticis.—Tincture of Coto Bark. *Dose*, ♏x–xv.
Cotoina.—Cotoine. *Dose*, gr. ss–j.
Paracotoina.—Paracotoine. *Dose*, gr. ss–ij.

Pharmacology.—Coto bark is obtained from Bolivia, but its botanical origin is still undetermined. Several authors believe that it comes from a member of the natural order Lauraceæ, and this statement is adopted by the National Dispensatory of 1886. It is received in the form of flat or curved pieces a foot or more in length and ¾ inch broad. Externally it is of a cinnamon-brown color, but when broken it appears studded with numerous scattered golden-yellow spots. It has an aromatic odor, which is more perceptible when the bark is bruised. The powder is very irritant to the Schneiderian mucous membrane. The taste is aromatic, sharp, and slightly bitter, but not astringent. The active principle is a crystallizable substance termed **Cotoine,** of a pale-yellow color, slightly soluble in cold water, but soluble in hot water, alcohol, ether, chloroform, and alkaline solutions. Cotoine is precipitated by hydrochloric acid with a clear, yellow color. It is colored blood-red by nitric acid, brownish yellow by sulphuric acid, and black by ferric chloride. A bark differing in external appearance from coto, but similar in chemical composition and therapeutic effects, and probably derived from an allied species, has been designated paracoto. Paracoto contains an active principle called **Paracotoine,** analogous to cotoine in composition and effects, but feebler. Powdered paracoto is unirritant to the nasal mucous membrane. Paracotoine is of a bluish color, and but slightly soluble in boiling water.

Physiological Action.—Applied to the unbroken skin, powdered coto causes heat and redness. Taken internally, it gives rise to a sensation of warmth in the stomach, and in large doses to nausea and vomiting. It stimulates the secretion of saliva. Small doses may increase the appetite. It is eliminated in the urine. Coto retards the development of bacteria and the occurrence of putrefaction. It causes active dilatation of the intestinal blood-vessels. Coto does not produce constipation in healthy individuals.

Therapy.—Coto and paracoto are remarkably efficient remedies in diarrhœa. They are applicable to all varieties of the disorder, except that dependent upon ulcers of the bowel, in which they have generally failed. Abundant testimony exists as to its worth in functional diarrhœa, acute and chronic gastro-intestinal catarrh, cholera infantum, the diarrhœa of typhoid fever, of rachitis, insanity, and in that form resulting from

reduced nutrition. It is exceedingly valuable in the treatment of tuberculous diarrhœa, and is at the same time of service in reducing the fever and checking the night-sweats. Professor Baelz, of Tokio, Japan, successfully treated five cases of Asiatic cholera by hypodermatic injections of paracotoine. Coto has been found effective also in hyperidrosis. In a case mentioned by Dr. J. Burney Yeo, coto not only arrested the diarrhœa of a severe case of exophthalmic goitre, but also seemed to have a remarkable influence upon the nervous phenomena. Yeo recommends the following mode of administration:—

Fluid extract of coto,	1 drachm.
Compound tincture of cardamom,	1 "
Mix these together and slowly triturate them with	
Mucilage of acacia,	3 drachms.
Simple syrup,	2 "
Water, enough to make 6 fluidounces.	

Dose, a tablespoonful.

This is an opaque mixture of a not unpleasantly warm and aromatic taste. Two or three doses generally arrest or check the severest forms of tuberculous diarrhœa. The author has employed the following prescription in chronic and in tuberculous diarrhœa, the effect being complete cessation of all discharge:—

℞ Extracti coto cort.,	fʒij.
Extracti hamamelidis fl.,	f℥ss.
Aquæ cinnamomi,	f℥x.

M. Sig.: A dessertspoonful every three or four hours.

Laborde prepared a wine of coto according to the following formula:—

Coarsely-powdered coto-bark,	30 grammes.
Malaga wine (16 degrees),	1000 "

Macerate for ten days, shaking occasionally, and filter.

Professor Albertoni, to whom we owe the most comprehensive study of the physiological action of coto, observed no favorable results in drunkards or where the portal circulation was embarrassed, as in cirrhosis. He considers it contra-indicated when there is hyperæmia of the bowel and a tendency to intestinal hæmorrhage. For the same reason it should be used with circumspection in acute intestinal catarrh. According to this writer the beneficial effects of coto are due to its favorable influence, through active dilatation of the blood-vessels, upon the intestinal epithelium, promoting its nutrition and modifying its physiological functions.*

* See paper by author, "The Physiological and Therapeutical Action of Coto-Bark," in Medical Bulletin for February, 1891.

CREASOTUM (U. S. P.).—**Creasote.**
Dose, ♏ i–iij.

Preparations.

Aqua Creasoti (U. S. P.).—Creasote-Water (1 per cent.). *Dose,* f℥ss–iv.
Unguentum Creasoti.—Ointment of Creasote (♏xxx–℥j).

Pharmacology.—Creasote is a product of the distillation of wood-tar, or, more correctly, one of the products of the distillation of wood, separated from tar by fractional distillation; it was discovered in 1830 by Reichenbach. It is largely contaminated or substituted in commerce by a similar substance obtained from the distillation of bituminous coal, made up of carbolic and cresylic acids principally. Wood-tar creasote is chiefly composed of the following phenols, **Guaiacol, Creasol, Methyl-creasol,** and **Phloral.** The creasote made from beech-wood is of a reddish-amber color; it is the best for medicinal use. It is an oily liquid, nearly colorless; of smoky odor, caustic taste, and neutral reaction; soluble in 80 parts of water, and in all proportions of alcohol, ether, etc. It differs from carbolic acid in being less caustic and in not coagulating collodion or albumin,* but has probably equal, if not superior, antiseptic effects, as seen in its power of preserving meat, from which it derives its name. With the tincture of the chloride of iron, an alcoholic solution of creasote develops a deep, greenish-blue color; but carbolic acid produces a light brown.

Physiological Action.—Creasote is a local sedative. Internally, it very closely resembles the effects of carbolic acid as an anæsthetic antiseptic and astringent. It escapes from the body by the bronchial mucous membrane in part, and has expectorant powers; in part it is also excreted by the kidneys. Creasote has a special sedative action upon the nerves of the stomach and allays irritability and nausea. It has a similar effect upon the bronchial mucous membrane when its vapor is inhaled with the vaporizer or steam-atomizer. In overdoses, creasote causes giddiness, depressed action of the heart, faintness, convulsions, or coma. The antidotes are probably the same as those to carbolic acid, since Hare has found that the soluble sulphates are efficacious antidotes to creasote-poisoning.

Therapy.—As a local anæsthetic, creasote is largely used by dentists in aching teeth with sensitive dentine, and as an application to an exposed nerve-pulp; the remedy being taken up on a little absorbent cotton, and excess removed by allowing it to rest upon blotting-paper before being inserted into the cavity of a tooth, from which *débris* of food or other material should first be removed by syringing with warm water. Creasote-water has some hæmostatic qualities, and is an antiseptic dressing

* The United States Dispensatory says that creasote "powerfully coagulates albumin."

of value in sloughing ulcers, or for injection into sinuses. In gleet and other catarrhal diseases, creasote often acts well when used as follows :—

℞ Creasoti,	♏v.
Ext. geranii fl.,	f℥ss.
Aquæ rosæ,	f℥iv.

M. Sig.: Inject night and morning into the urethra,—alone or slightly diluted with warm water.

Creasote is believed to have special value in the treatment of burns and in chilblains. In skin diseases of a scaly character and pruritus, creasote is a useful application; and in erysipelas the ointment is of benefit in relieving the pain and reducing the inflammation. This ointment relieves the itching and burning of erythema multiforme and of eczema, and is beneficially applied to ulcerated surfaces and psoriasis. Creasote ointment is very advantageously prescribed in connection with carbonate of lead, as :—

℞ Plumbi carbonatis,	ʒj.
Unguenti creasoti,	℥j.

M. For erysipelas, erythema, acute eczema, and burns.

A gargle containing creasote in sloughs of the mouth or throat, purifies the breath, and stimulates the ulcer to repair.

For catarrhal laryngitis, and tubercular disease of the air-passages, creasote can be sprayed over the surface as in this prescription :—

℞ Creasoti,	fʒj.
Tinct. benzoin. co.,	fʒij.
Aquæ hamamelidis dest.,	
Glycerini,	āā f℥iss.

M. Sig.: Use in an atomizer. Spray over the surface three or four times a day.

Taken into the stomach, it checks fermentation and reduces irritability, checking nausea and correcting the causes productive of diarrhœa. It is a useful remedy in sea-sickness and the vomiting of pregnancy, and in the summer diarrhœa of adults as well as of infants. In the first-mentioned disease the nausea and vomiting may be overcome by this combination of creasote :—

℞ Creasoti,	♏v.
Morphinæ sulphatis,	gr. j.
Aquæ menth. pip.,	f℥iij.

M. Sig.: A teaspoonful every two or three hours until relieved.

In chronic bronchitis, bronchorrhœa, and phthisis, creasote has been given with marked benefit, especially where cavities have formed, as in the following combinations :—

℞ Creasoti, ... ♏i–iij.
Tr. gentianæ comp., ... ♏xxx.
Spiritus frumenti, ... q. s. ad fʒij.

M. Sig.: Take four times daily.

℞ Creasoti,
Tinct. capsici, ... āā fʒj.
Syrup. acaciæ, ... f℥j.
Syrup. limonis, ... f℥iv.

M. Sig.: A teaspoonful with water after meals.

℞ Creasoti, ... fʒss.
Syrup. ferri iod.,
Glycerini, ... āā f℥iij.

M. Sig.: A teaspoonful in water three or four times a day.

Creasote may be given in a pill, or the prescribed number of drops added to a teaspoonful of old Jamaica rum, diluted with water. In a considerable proportion of cases, cough and expectoration are diminished and fever and night-sweats are lessened.

As creasote is of variable composition, containing from 60 to 90 per cent. of **Guaiacol,** Sahli has proposed that the latter body should be employed instead of creasote in the treatment of phthisis. Guaiacol is a colorless liquid, sparingly soluble in water, but very soluble in ether, alcohol, and fatty oils. It is more agreeable in odor and taste than creasote, and is said to be better borne. It improves the appetite and digestion and prevents or relieves flatulence. It is probably eliminated by the lungs, exerting a directly local beneficial action. It indirectly reduces hectic fever and checks night-sweats. When given at an early stage of the disease, the bacilli diminish remarkably in number and may even entirely disappear. Labadie-Lagrave has advantageously prescribed guaiacol in the form of pearls or capsules. Bourget, of Geneva, prescribes it dissolved in wine or codliver-oil.* Dr. Charles Eloy, of Paris, recommends creasote to be given in emulsion, as follows:—

℞ Ol. amygdal. dulc., ... f℥v.
Creasoti, ... fʒiij.
Misce et adde
Pulv. acaciæ, ... f℥iii ʒv.
Aq. menth. pip., ... f℥xvj.

M. Sig.: From two to five tablespoonfuls a day.

Seitz prefers to combine creasote with codliver-oil and make an emulsion with the aid of saccharin. Both creasote and guaiacol have been injected beneath the skin or into the lung. Creasote affords relief in flatulent dyspepsia, sarcina ventriculi, and gastralgia. It can be prescribed, in the diseases just referred to, as follows:—

* Le Progrès Médical, April 26, 1890; Medical Bulletin. July, 1890, p. 253.

℞ Creasoti, ... ♏v.
Tinct. capsici, ... f℥ss.
Aquæ sodæ menth., ... q. s. ad f℥iij.
M. Sig.: A teaspoonful in water at meals.

℞ Creasoti, ... ♏vj.
Glycerini,
Syr. acaciæ, ... āā f℥iss.
M. Sig.: A teaspoonful before meals.

Creasote has been successfully employed in diabetes mellitus by P. Valentin, who gave it in daily doses of 4 drops, increased gradually to 10 drops. The sugar soon disappeared, and did not return even when a diet containing starch and sugar was allowed. Good results have been obtained from creasote in typhoid fever, diphtheria, scarlet fever, and erysipelas. A. Atkinson has found it efficacious in the treatment of tape-worm. A mixture of creasote, spirit of chloroform, and tincture of lavender may be used in an inhaler in diseases attended with profuse, bad-smelling expectoration. This mixture, or those of similar composition, all prove of great value in removing the offensive odor of gangrene of the lung in phthisis, laryngitis, chronic bronchitis and also in asthma :—

℞ Creasoti,
Ethyl iodidi,
Terebenis, ... āā f℥j.
M. Sig.: For inhalation. Ten to twenty drops in an inhaler when necessary.

℞ Creasoti,
Eucalyptolis,
Spt. vini rectificat.,
Terebenis, ... āā f℥j.
M. Sig.: For inhalation. Ten to twenty drops, as necessary.

℞ Creasoti,
Thymoli,
Spiritus vini rectificat., ... āā f℥j.
M. Sig.: For inhalation. Ten to twenty drops.

Koch's method of treating erysipelas consists in applying the following ointment, spread evenly with a camel's hair pencil, in a thin layer over the affected part :—

℞ Creasoti vel Creolini . . . . f℥j.
Iodoformi, ... ℥iv.
Lanolini, ... ℥x.

M. After applying the ointment as directed, cover the surface with a thin sheet of gutta-percha or rubber cloth.

CREOLINUM.—Creolin.

Dose, ♏ii–v.

Pharmacology.—Creolin is obtained from English coal by dry distillation, the carbolic acid being separated and the residue emulsified by a special process with the addition of caustic soda. The details of its mode of manufacture, however, have not yet been published. It is a syrupy, dark-brown, or blackish fluid of a tar-like odor. It mixes with water in all proportions, forming an opaque, whitish emulsion. It is soluble in alcohol. The exact chemical constitution of creolin has not been determined, but it seems to consist largely of hydrocarbons joined with phenols free from any trace of carbolic acid, together with a small proportion of organic bases of the pyridine order and alkaline ash.

Physiological Action.—A 3-per-cent. aqueous dilution excites no irritation when applied to the skin. When the skin is subjected to the action of a 5-per-cent. dilution for a considerable time, a slightly burning sensation results, but soon disappears. Creolin is irritant to mucous membranes. It is an efficient germicide, in some respects more powerful than carbolic acid. It is more destructive than carbolic acid to the micro-organisms of typhoid fever, Asiatic cholera, and suppuration; while, upon dried spores of the anthrax bacillus, carbolic acid exerts a more powerful inhibitory influence than creolin. Carbolic acid is likewise the more efficacious and permanent disinfectant of putrefaction. Creolin possesses the advantage of being much less toxic. It was at first, in fact, supposed to be entirely devoid of toxicity. This claim can be no longer upheld, since several patients, especially among the 2000 midwifery cases reported by Dr. Bitter*, of Breslau, showed symptoms of nausea, chill, fever, dyspnœa, collapse, and albuminous urine following its use. In one case reported, a scarlatiniform rash, with thirst, fever, and itching of the skin, was produced. In another instance, however, as much as 8 ounces were used without fatal consequences. The addition of 1 or 2 per cent. of creolin removes the characteristic odor of iodoform.

Therapy.—It is almost exclusively as a local application that creolin has been used, though it has been administered internally in a few instances with the effect of preventing gastro-intestinal fermentative processes. As an efficient and safe antiseptic, it is very advantageously employed in a 1- or 2- per-cent. solution to irrigate accidental or surgical wounds. A 2-per-cent. dilution in olive- or linseed- oil, applied upon absorbent cotton, is an excellent dressing to abscess-cavities, sinuses, to wounds left after resection of bone, removal of a sequestrum, to compound fractures, etc. In addition to its parasiticide virtues, it is additionally serviceable as a

* British Medical Journal, December 13, 1890.

dressing to fresh wounds from its hæmostatic properties, promptly arresting the oozing from divided capillaries. A weak dilution of creolin in water or alcohol makes a good wash in ozæna. Five or six drops may be added to a pint of water, or we may follow the method of Moure and prescribe :—

℞ Creolini, ... ♏xv.
Spt. vini rect., ... f℥iiiss.

M. A teaspoonful of this solution is added to a quart of tepid water.

Schnitzler has used creolin in diseases of the larynx, especially tuberculosis, by inhalation (1 part in 1000 of water), by insufflation (from 1 to 5 parts to 100 of sugar of milk), or 1 to 5 parts to 100 of water directly to the diseased parts by mopping. Schnitzler and Kortüm likewise recommend it as a gargle in diphtheria. A 1-per-cent. solution has been found curative in thrush and aphthæ. The injection, two or three times a day, of 2 to 4 pints of a ½-per-cent. solution has yielded excellent results in dysentery. In this strength the intestinal mucous membrane was not irritated; no burning or abdominal pain was produced. The offensive odor of cancer is removed by creolin. A 5- to 10- per-cent. creolin-oil is efficient in pediculosis and scabies, or prescribed thus :—

℞ Creolini, ... f℈ss.
Balsam. Peruviani, ... f℈ij.
Adipis, ... ℥j.

M. Sig.: Apply well over the surface. Use in scabies.

A 1-to-1000 aqueous solution has been used in gonorrhœa. It has seemed much more beneficial in gonorrhœa of women than of men. A 1-per-cent. solution is a very efficacious injection in the cystitis of women. In diseases of women it can also be employed according to the following formulæ :—

℞ Creolini, ... f℈j.
Ext. hydrastis Canadensis fl., ... f℥ss.
Glycerini, ... f℥iiss.

M. Sig.: One or two teaspoonfuls in a pint of water, to be employed at one injection. Use in leucorrhœa and pruritus of the vagina.

℞ Creolini, ... f℈j.
Boro-glyceridi (50 per cent.), ... f℥v.

M. Sig.: Use as an injection, one to two teaspoonfuls in a pint of water, for uterine and vaginal diseases.

As a wash in puerperal septicæmia, and as an antiseptic vaginal injection before or after labor, a creolin solution is of value. Five or six drops to a pint of water have been successfully used in otorrhœa. In extensive burns and in bed-sores, Kortüm recommends a 5-to-1000 aqueous solution. A 1- or 2- per-cent. solution is an excellent deodorant and stimulant

dressing to leg-ulcers. Rothe* has used creolin in the form of an ointment with marked success in the treatment of erysipelas, tinea versicolor, eczema, and in scabies.

A 2-per-cent. solution is an admirable disinfectant to the hands of the surgeon. A creolin-soap is also made. The opacity of its watery solution renders creolin inferior to carbolic acid as an immersion fluid for instruments. Moreover, resinous particles are soon deposited upon the instruments, though this drawback has been overcome by the manufacture of vessels having a perforated false bottom upon which the instruments may rest. Gauze, bandages, and absorbent cotton may often be advantageously impregnated with a creolin solution. A 1- or 2- per-cent. ointment of creolin, and a powder composed of 2 parts of creolin to 100 of boric acid, will in many conditions be found serviceable. In the acute gastro-enteritis of children, Schwing has obtained satisfactory results from doses of 2 or 3 drops of creolin administered in some demulcent vehicle.

CROCUS (U. S. P.).—**Saffron.**
Dose, gr. x–xx.

Preparation.

Tinctura Croci (U. S. P.).—Tincture of Saffron (10 per cent.). *Dose,* f℥i–ij.

Pharmacology.—The stigmas of Crocus sativus (Iridaceæ) are officinal under the title of Crocus. They are obtained from cultivated plants in the south of Europe. Spanish saffron has a strong, peculiar odor, an aromatic, bitter taste, and imparts a yellow hue to the saliva when chewed. So-called American saffron is a different plant, the Carthamus tinctorius, or safflower, of which the flowers are used. Saffron of good quality, however, is cultivated in Pennsylvania.

Therapy.—Saffron is slightly aromatic and feebly anodyne and antispasmodic. A hot infusion called saffron-tea is made from the safflower and not from saffron; it is used in domestic practice to bring out the eruption in measles and scarlet fever and as a diaphoretic. In Europe the tincture of saffron is employed as an emmenagogue, but here its only use, as a rule, is that of a coloring agent.

CUBEBA (U. S. P.).—**Cubeb.**
Dose, gr. xx–℥ij (of the recently-powdered drug).

Preparations.

Extractum Cubebæ Fluidum (U. S. P.).—Fluid Extract of Cubeb. *Dose,* ♏x–xxx.
Oleoresina Cubebæ (U. S. P.).—Oleoresin of Cubeb. *Dose,* ♏v–xxx.
Oleum Cubebæ (U. S. P.).—Oil of Cubeb. *Dose,* ♏v–xij.
Tinctura Cubebæ (U. S. P.).—Tincture of Cubeb. *Dose,* f℥ss–ij.
Trochisci Cubebæ (U. S. P.).—Troches of Cubeb (♏ss oleoresin).

* Brit. Journ. of Dermatology, November, 1890.

Pharmacology.—The unripe fruit of the Cubeba officinalis (Piperaceæ), a plant cultivated in Java, contains a volatile oil and an acrid resin; the latter composed of **Cubebin,** a tasteless, insoluble, neutral substance, and **cubebic acid,** with fat, gum, etc. **Cubebene,** a camphoraceous substance, can be separated from the volatile oil, leaving **Cubeben,** a liquid oil, behind. The medicinal activity of the drug consists principally in the volatile oil and cubebic acid, which are both present in the oleoresin.

Physiological Action.—The effects of cubeb are those of an aromatic stimulant to the stomach, improving the digestion in small doses and increasing appetite; deranging digestion in larger doses and acting as an irritant. Cubeb increases the force and frequency of the heart's action, stimulates the genital organs, and promotes menstruation. It is eliminated by the skin (frequently causing an urticarial or vesicular eruption), by the bronchial mucous membrane (acting as an expectorant and antiseptic), but chiefly by the kidneys (increasing the quantity of urine and disinfecting the urinary passages).

Therapy.—The powder of cubeb is considered a good application in hay fever, chronic nasal catarrh, and follicular pharyngitis. In hay fever, if it does not increase the irritation, it may be useful. In asthma, or swollen "hypertrophies" in the nose, cubeb cigarettes are smoked with relief. Cubeb is principally used in blennorrhœa, cystitis, and purulent affections of the genito-urinary tract. In gonorrhœa it may be given in all stages of the disease, acting best in the acute stage. Some patients, however, appear to be very susceptible to the effect of this drug, small doses causing digestive disturbance, irritability of the bladder, and bloody urine. A mixture of cubeb and alum is an efficacious, though nauseous, remedy in chronic gonorrhœa. It may be thus prescribed:—

℞ Pulv. aluminis, ... ʒj.
Pulv. cubebæ, ... ℥iv.
M. Sig.: A tablespoonful three times a day.

By a combination of cubeb and copaiba the effect of each agent in gonorrhœa is increased:—

℞ Oleoresinæ cubebæ,
Copaibæ, ... āā fʒj.
Pulv. sacch. alb.,
Pulv. acaciæ, ... āā ℥ss.
Aquæ menthæ piperitæ, ... q. s. ad f℥iv.
M. Sig.: Teaspoonful three times a day.

Functional irritability of the bladder, so common in women, is often relieved by cubeb. In chronic catarrh of the lower bowel and in the

interparoxysmal periods of pseudo-membranous enteritis, cubeb is likewise advantageous.

Atonic dyspepsia may receive benefit from the temporary employment of small doses of cubeb, which are of service also in bronchorrhœa.

The troches of cubeb may be used in the treatment of sore throat and hoarseness, from two to five daily being allowed to slowly dissolve in the mouth.

CUPRUM.—Copper.

Preparations.

Cupri Acetas (U. S. P.).—Acetate of Copper. *Dose*, gr. $\frac{1}{10}$.

Cupri Sulphas (U. S. P.).—Sulphate of Copper. *Dose*, gr. $\frac{1}{8}$ (gr. ij as an emetic).

Cuprum Ammoniatum.—Ammoniated Copper. *Dose*, gr. $\frac{1}{8}$–j.

Cupri Arsenis.—Arsenite of Copper. *Dose*, gr. $\frac{1}{40}$–j.

Cuprum Aluminatum.—Aluminated Copper. Lapis Divinus. External use.

Ceratum Cupri Acetatis.—Cerate of Acetate of Copper. (Melt together yellow wax, 50 parts; Burgundy pitch, 25 parts; European turpentine, 15 parts; strain; incorporate thoroughly finely-powdered acetate of copper, 5 parts; pour into molds, to form cakes of about 1 centimetre thickness). Green cerate, for corns, warts, etc.

Pharmacology.—Copper has two officinal salts—the acetate and sulphate—which are irritating poisons, although the metal is inert, because insoluble. Copper was formerly used very much in making cooking-utensils for family use, but it was found that, unless kept very bright and clean, they would give rise to poisoning by the formation of verdigris, a basic acetate of copper. Copper is sometimes added to pickles to make them of a brighter-green color, a fraud which can be detected by placing a blade of a knife, or polished piece of steel, in the liquor; if it contain copper, there will be a deposit of metallic copper upon the iron in the course of a few minutes. It is held that the very small amount of copper that would be introduced into the system by eating such a pickle would be only a mere fraction of a grain, and not enough to cause symptoms. A far more dangerous source of poisoning is found in the wall-paper pigments containing arsenite of copper, which is very poisonous. It is not only the green colors that are dangerous, but all vivid colors, such as scarlet, crimson, or lake. It is especially velvet or embossed papers that are likely to be loaded with pigment, and these should never be used for a dwelling-house unless first tested and found to be free from arsenic by the ordinary tests for that poison.

Physiological Action.—When locally applied, the sulphate of copper is an astringent or a caustic, according to the manner of application. Injected hypodermatically, it causes coma and convulsions in cats, and death from respiratory failure; in overdose by the stomach it causes fatal gastro-enteritis. Copper in very small proportion exists normally

in the blood, and in minute doses it exerts a tonic effect upon the organism. This is well shown in some skin diseases of a dry type, due to defective nutrition, and in incipient or threatened phthisis. The secretions along the gastro-intestinal tract are increased, as shown by the salivation, vomiting, and purging. It is a local and not a systemic emetic. Copper is eliminated by the liver, kidneys, salivary and intestinal glands. It may remain, like other metals, stored up for a considerable period within the liver.

When any of the salts of copper have been swallowed in overdose, there are nausea, vomiting and retching, purging of blood and mucus, and rapid depression of bodily powers; and the latter may be the more prominent. In chronic poisoning, pharyngeal irritation, bronchial catarrh, colic, diarrhœa, or dysentery, salivation, anæmia, and emaciation occur. There is sometimes a green line upon the gums. Jaundice and fatty degeneration or atrophy of the liver ensues, and pulmonary congestion or consolidation may set in. The effects upon the nervous system are seen in headache, defective co-ordination, and weakness, with nervous vomiting. The chemical antidote is the yellow prussiate of potash, followed by demulcents, eggs, milk, oil, etc., and the stomach should be irrigated with an alkaline solution, counter-irritation applied, and anodynes given.

Therapy.—The sulphate of copper, in solid stick, is used as a superficial caustic in indolent ulcers, exuberant granulations, and in syphilitic and other sores in the mouth and throat. It may also be lightly applied in cases of granular lids, or a solution (gr. i–ij to f℥j) instilled into the eye in subacute conjunctivitis, but for this the acetate is preferred. A crystal of sulphate of copper is likewise serviceable as a hæmostatic in checking hæmorrhages from slight wounds, leech-bites, or the surface of irritable ulcers. A solution of this salt is employed locally with benefit in order to suppress excessive and chronic discharges. In the strength of from 10 to 20 grains to the ounce of menstruum it may be thrown into the bowel for the relief of chronic diarrhœa or dysentery. The same method is beneficial in acute diarrhœa of severe form. From 5 to 10 grains of the sulphate dissolved in an ounce of glycerin is one of the preparations which may be recommended for use in pseudo-membranous enteritis. The fluid should be injected into the bowel during the interparoxysmal period for the purpose of modifying the condition of the mucous membrane. A weak, aqueous solution of the sulphate of copper is an excellent stimulant dressing to chancres and chancroids. and forms a good injection in leucorrhœa, vaginitis, and gleet. It enters into the composition of injections for gonorrhœa, and may be advantageously combined as follows :—

℞ Cupri sulphatis,		gr. xij.
Zinci sulphatis,		
Plumbi acetatis,	āā	gr. xxiv.
Ext. krameriæ fl.,		f℥j.
Vini opii,		f℥ij.
Aquæ rosæ,	q. s. ad	f℥vj.—M.

℞ Cupri sulphatis,	gr. v.
Ext. geranii fl.,	f℥ss.
Glycerini,	f℥j.
Aquæ rosæ,	f℥iiiss.—M.

The oleate of copper is an admirable astringent, antiseptic, and antiparasitic preparation, especially valuable in the various forms of tinea trichophytosis.

The sulphate is sometimes effective as a local stimulant in an indolent impetigo, and a weak solution is efficacious in ulcerative stomatitis and thrush. An ounce of the sulphate in a pint of water is a solution which has been found very efficacious in the treatment of scabies. Other cutaneous affections, as psoriasis, chronic eczema, sycosis, favus, acne, hyperidrosis, and bromidrosis, are ameliorated by the topical application of the sulphate or acetate of copper in the form of an ointment or a lotion, or the oleate made into a 10- or 20- per-cent. ointment. A gargle containing 5 grains of the sulphate of copper to the ounce of water does good in relaxed sore throat. The sulphate, or other salts of copper, may be employed externally in the following formulæ:—

℞ Cupri sulphatis,	gr. v.
Aquæ hamamelidis dest.,	f℥v.

M. For a gargle, or apply over the surface for hyperidrosis or bromidrosis.

℞ Cupri sulphatis,	gr. x. vel xxx.
Acidi borici,	ʒj.
Creasoti,	♏x.
Ungt. aquæ rosæ,	℥j.

M. Useful in sycosis and parasitic diseases of the skin.

In summer diarrhœa and cholera infantum the sulphate of copper is of undoubted efficacy. It is likewise a valuable remedy in the diarrhœa and dysentery of adults. Diarrhœa, whether acute or chronic, will often yield to the sulphate of copper. It has been found of service in restraining tuberculous diarrhœa, and has been highly praised by some writers for its virtue in the diarrhœa of typhoid fever. The same salt is useful in bronchorrhœa. A small dose of the sulphate, $\frac{1}{20}$ grain three times a day, will sometimes allay the vomiting of pregnancy. Small doses of the same salt, given with or after meals, improve nutrition, and have been recommended as of service in ecthyma, scrofula and tuberculosis.

Its action as a prompt emetic is best utilized in phosphorus poisoning, where it is also antidotal. In other cases the zinc salts, or mercury subsulphate, are better, because safer. Copper has very decided action upon the nervous system, and the ammoniated copper particularly is used and highly praised for its effects in chronic neuroses, epilepsy, chorea, hysteria, and in the treatment of facial neuralgia. Dr. Boardman Reed, of Atlantic City, speaks favorably of the use of arsenite of copper in minute doses as an antispasmodic in cases of after-pains.* He gives $\frac{1}{1000}$ grain every half hour with complete relief. It has also been highly extolled in the treatment of diarrhœa of infancy, where it may exert an antiseptic action upon the contents of the intestinal tract, when given in small and frequently repeated doses, as first suggested by Dr. Reed. A solution prepared in this manner is often of marked benefit in after-pains, diarrhœa, and in cholera morbus.

℞ Cupri arsenitis, ... gr. ss.
Aquæ camphoræ,
Aquæ cinnamomi, ... āā f℥iv.
M. Sig.: From one-half to a teaspoonful every half hour or hour until relieved.

The aluminate of copper is used externally as a stimulant and astringent to ulcers, and as a collyrium for inflammation of the conjunctiva. It is a powder compound of equal parts (30 parts) of copper sulphate, alum, and nitrate of potassium, with a small proportion (2 parts) of campor.

CURARE.—Curare, Woorara, or Arrow-Poison.

Dose, gr. $\frac{1}{20}$ to $\frac{1}{3}$, hypodermatically administered.

Pharmacology.—A blackish-brown, brittle substance, of unknown composition, made by natives of South America as an arrow-poison, and probably contains Paulinia curare and other plants of the Strychnos family, or Cocculus. An extremely poisonous alkaloid, **Curarine,** has been obtained from curare.

Physiological Action.—No effect follows the introduction of this drug into the stomach, as absorption is slow, and it is very rapidly thrown out of the circulation by the kidneys, and hence it is unlikely that it is a poison allied to strychnine or cocculus, but it seems more like a virus of animal origin.

It must be injected hypodermatically in order to produce its characteristic symptoms, which are: paralysis of the voluntary muscles by loss of power of the end organs of the motor nerves; subsequently, the brain-centres are affected, if life be sustained by artificial respiration, death being brought about by respiratory failure. The blood-pressure is

* Times and Register, December 6, 1890.

lowered and the heart is weakened. Sugar appears in the urine. The antidotes are strychnine and atropine, diffusible stimulants, artificial respiration, warmth and friction to the extremities, the use of the catheter, etc.

Therapy.—The use of curare in practical medicine at present is limited to the treatment of hydrophobia, two cases having been reported in which the symptoms disappeared under its use and the patient recovered. The drug is very variable in composition and effects, but $\frac{1}{20}$ grain may be given hypodermatically and repeated according to the symptoms. Trial has been made of curare in other affections characterized by spasm, as chorea, tic douloureux, epilepsy, and tetanus; and although a certain measure of success has attended its employment, yet different samples vary so greatly in composition that it has been found of less practical value than would be inferred from its powerful physiological action.

CYDONIUM (U. S. P.).—Cydonium, Quince-Seed.

Preparation.

Cydonii Mucilago (U. S. P.).—Mucilage of Cydonium (2 per cent.).

Pharmacology and Therapy.—The seeds of Cydonium vulgaris (Rosaceæ) are officinal in order to provide the mucilage of Cydonium, these seeds containing about 20 per cent. of vegetable mucilage. It is best made with rose-water. It is used locally in inflammation of the skin, or conjunctivitis, or it may be used internally, *ad libitum*, in disorders of the alimentary canal requiring a demulcent.

CYNOGLOSSUM.—Cynoglossum.

Pharmacology and Therapy.—The root of the Cynoglossum officinale (Boragineæ), an indigenous plant, is of interest, because it contains **Cynoglossine,** a brown, amorphous substance, soluble in water and alcohol, having an alkaline reaction, which Buchheim, its discoverer, found to possess narcotic powers. Its physiological action is said to be analogous to that of curare.

CYPRIPEDIUM (U. S. P.).—Cypripedium, Ladies' Slipper.

Dose, gr. xv–xxx.

Preparations.

Extractum Cypripedii Fluidum (U. S. P.).—Fluid Extract of Cypripedium. *Dose,* ♏x–xx.
Extractum Cypripedii.—Extract of Cypripedium. *Dose,* gr. i–v.

Pharmacology.—The rhizome and rootlets of Cypripedium pubescens and of Cypripedium parviflorum (Orchidaceæ). The rootlets have a heavy, disagreeable odor, and contain a volatile oil, a volatile acid, resins, and tannin. **Cypripedin** is an impure alcoholic extract (dose, gr. ii–iij).

Physiological Action and Therapy.—In its effects it resembles valerian as an antispasmodic, tonic, stimulant, and diaphoretic. It is given in neurasthenia, nervous hyperæsthesia, neuralgia, nervous headache, hypochondria, insomnia, and epilepsy.

DAMIANA.—Damiana.

Dose, ℥ss, in infusion or decoction.

Preparations.

Extractum Damianæ.—Extract of Damiana. *Dose,* gr. v–xv.

Extractum Damianæ Fluidum.—Fluid Extract of Damiana. *Dose,* f℥ss–iv.

Glycerol Damianæ, Phosphori et Nucis Vomicæ (containing in each fluidounce, damiana, ℨj; phosphorus, gr. $\frac{1}{16}$; nux vomicæ, gr. iv). *Dose,* fℨj.

Elixir Damianæ.—Elixir of Damiana. *Dose,* fℨii–℥j.

Pharmacology.—A small, mint-like plant (Turnera diffusa, microphylla, or aphrodisiaca; natural order, Turneraceæ), bearing yellowish-white, fragrant flowers, growing near the western coast of Mexico. Several years ago it was introduced into medical circles in this country with statements concerning its wonderful invigorating powers, especially in stimulating the generative functions, and of the esteem in which it was held among the natives. Other plants have been sold under the name of damiana, and it is probable that some of the uncertainty of result has been due to the substitution of some other drug for the Turnera. The leaves are the part used; they contain a volatile oil, a resin, and other constituents.

Physiological Action.—Upon the sexual appetite and function, damiana undoubtedly exerts some stimulant effects; but it is also a general tonic. Upon the digestive organs it acts as a carminative, and in larger doses as a cathartic or laxative. It is slightly cholagogue, and is also a stimulating diuretic.

Therapy.—In nervous dyspepsia, neuralgia, cerebral exhaustion, neurasthenia, or want of tone in the nervous system, also in sick-headache or migraine, damiana has been found to be useful. It is specially employed, however, in treating functional impotence from any cause, combined with hygienic and other treatment, especially nux vomica, iron, and phosphorus.

DIGITALIS (U. S. P.).—**Digitalis, Foxglove.**

Dose, gr. ss–ij.

Preparations.

Abstractum Digitalis (U. S. P.).—Abstract of Digitalis. *Dose,* gr. ss–j.

Extractum Digitalis (U. S. P.).—Extract of Digitalis. *Dose,* gr. ¼–½.

Extractum Digitalis Fluidum (U. S. P.).—Fluid Extract of Digitalis. *Dose,* ♏ss–ij.

Infusum Digitalis (U. S. P.).—Infusion of Digitalis (1½ per cent.). *Dose,* fℨi–iv.

Tinctura Digitalis (U. S. P.).—Tincture of Digitalis (15 per cent.). *Dose* ♏x–xxx,

Digitalinum.—A mixture of several active principles. *Dose,* gr. $\frac{1}{60}$–$\frac{1}{30}$.

Pharmacology.—The leaves of Digitalis purpurea (Scrophulariaceæ), gathered from plants of the second year's growth. **Digitaline,** which was formerly officinal, and considered as the active principle, is a mixture of several, the most active of which is **Digitoxin,** which, with **Digitalin** and **Digitalein,** represents the cardiac, stimulating action of the drug, while **Digitonin** appears to exert a contrary effect, acting like saponin (Schmiedeberg). A fifth substance, **Digitin,** seems to be devoid of physiological and therapeutical actions. These are all non-nitrogenous, and, with the exception of digitonin, are glucosides. No alkaloid is present in digitalis. It also contains tannin, volatile oil, fatty matter, red coloring matter, chlorophyll, albumin, starch, sugar, gum, lignin, and salts. Two acids have been discovered by M. Morin,—digitalic and antirrhinic. The varying solubility of the active principles in the vehicles used explains the difference of therapeutical effect. Digitalin is insoluble in water, but soluble in alcohol; digitoxin is insoluble in water, sparingly soluble in alcohol; digitalein is soluble in either; digitonin, soluble in water, sparingly in alcohol. The ordinary commercial digitaline is principally digitalin; Nativelle's digitaline is principally digitoxine with a little digitalin; it is a very active preparation. The tincture of digitalis and alcoholic fluid extract contain both digitalin and digitoxin; the infusion contains principally digitonin and very little digitoxin. In order to get the full physiological effect it is necessary to use the carefully-selected leaves, according to the pharmacopœial requirements.

Physiological Action.—Digitalis is readily absorbed by the skin, and is thought to have some local sedative effects when used on spongiopiline, or in a cataplasm. Although it has a bitter taste, digitalis has no tonic action upon the stomach, but, on the contrary, often disorders the digestion, and may cause vomiting or diarrhœa when too long continued. Its active principles readily diffuse into the blood, reducing the rate of the heart's action by lengthening the period of rest or asystole, thus allowing its cavities to receive more blood. At the same time that it increases the inhibition it stimulates the motor ganglia and increases the force of the contraction. Moreover, digitalin causes contraction of the arterioles throughout the body, and thus combines its effects with the preceding in order to raise arterial tension. The temperature is reduced in pyretic conditions, though not in health. The slowness of its action (requiring from thirty-six to forty-eight hours) in reducing fever and its likelihood of disturbing the stomach tend to preclude its use for this purpose in acute fevers. Its action upon the circulation may be summed up as being that of a vascular stimulant, raising arterial pressure, lowering abnormal temperature, and steadying the heart. Upon the brain and spinal cord it produces little direct effect. The reflex action of the spinal

cord is reduced by large doses, and there is stimulation of the pneumogastric and vasomotor nerves. It is liable to cause headache, delirium, and vertigo, possibly from disturbance of the cerebral circulation, the effects of the volatile oil, or from sick-stomach. Syncope may be due to heart-failure from overstimulation after the drug has been used for some time, especially if the patient suddenly sits up in bed or assumes an erect posture. It stimulates the vasomotor ganglia in the medulla. Large doses excite Setschenow's centre and produce muscular paralysis; the peripheral nerves, both motor and sensory, being also paralyzed. Respiration becomes feeble and more rapid, coma and convulsions follow, and death is attended by systolic arrest of the heart's action, from its tetanizing effect upon the cardiac muscle or from exhaustion of motor ganglia. The general action upon muscular tissue is to lessen contractility and cause lassitude and want of vigor. The venereal functions are depressed. The effect upon the kidneys is peculiar. The increase of arterial tension in the glomeruli accompanying the general effect on the circulation is assisted by a special action, by which the renal arteries are dilated, thus acting as a true diuretic; while the excretion of urea is at first increased, it subsequently diminishes. The greatest effect as a diuretic is obtained in diseased conditions, accompanied by œdema and low arterial pressure. Digitalis also has some effect upon the muscular tissue of the uterus, stimulating it to contraction.

Aconite and digitalis are antagonistic. The former slows the heart by expanding the peripheral vessels and lowering blood-pressure; the latter reduces the number of contractions by stimulating the inhibitory fibres in the pneumogastric nerve, and tightens up the arterioles, thus causing increased blood-pressure. Aconite directly lowers the action of the cardiac motor ganglia, and is a cardiac poison; digitalis indirectly exhausts the motor ganglia by permitting overaction and exhaustion; in the former, the heart is found, after death, in a condition of dilatation or asystole; in the latter, it is in a state of contraction or systole. The action of aconite upon the heart is rapid; the action of digitalis is gradual and slow; so that the latter is not a practical antidote for the other.

Poisoning.—When digitalis or digitalin has been taken by mistake in an overdose, tannin, or infusion of tea or coffee, should be given at once, the stomach washed out and stimulants given. Saponin is the physiological antagonist, according to Bartholow. The compound tincture of cinchona might be useful, as it contains tannin, alcohol, and quinine. The sulphate of iron or tincture of the chloride should also prove useful. The patient should be kept in a recumbent posture; hot drinks and hot-water bottles should be around him and spirit of ammonia inhaled. As long as the functions of the kidneys are maintained, it has been observed that

symptoms of so-called "accumulation" are not apt to arise. As already explained, these are attributed to overstimulation and exhaustion of the heart, but possibly there may be an uræmic element in some cases which would require appropriate treatment.

Therapy.—Locally, digitalis is employed in joint inflammation, combined with moisture and heat, acting as a sedative and possibly reducing the calibre of the vessels. Part of it is absorbed and carried to the kidneys, where it produces a diuretic effect, especially when the hot application is made over the loins. A half ounce or more of tincture of digitalis may be sprinkled upon spongio-piline, or flannel wrung out of hot water, and applied to the lumbar region; or a cataplasm containing a drachm or two of the leaves, applied in cases of dysuria or suppression of urine. Bronchial congestion due to heart disease may also be relieved by the local application of digitalis. Internally, it is chiefly prescribed as a heart-tonic in all cases of failure of circulation due to the feebleness of the heart's action. It should not be used in valvular disease as long as compensating hypertrophy is keeping up the work of the heart; but when this fails and dilatation is commencing, digitalis will not only slow and steady the heart, but improve the nutrition of the heart-walls by increasing the pressure in the coronary arteries and allowing them a longer time in which to be filled. In mitral stenosis, digitalis is to be used in order to allow the left auricle a longer time to empty itself into the ventricle; also, in tricuspid regurgitation with dilated right heart. It is not to be used in aortic stenosis, as a rule, although exceptional circumstances may require its use for a time, to regulate the rhythm of the heart, or to relieve dropsy. Cardiac dyspnœa or cardiac asthma, due to engorgement of the pulmonary circulation, is usually relieved by digitalis; and functional weakness, with irritable heart or low arterial tension, with migraine, or delirium tremens, is very promptly benefited by it. Large doses (f℥ss or more of the tincture) have been given in mania a potu and acute mania, with success. It is a useful remedy in hæmorrhages, as in menorrhagia or hæmoptysis, and in the first stage of pneumonia. Digitalis is of particular advantage in the metrorrhagia or menorrhagia of plethoric individuals, or when dependent upon mitral disease. Post-partum hæmorrhage may likewise be restrained by the use of digitalis, which may here be appropriately combined with ergot. This remedy is of service in controlling epistaxis, and is a valuable adjunct to the tincture of iron in purpura hæmorrhagica. In the treatment of hæmorrhages, digitalis is usefully prescribed in combination, as—

℞ Tr. digitalis, ... f℈iss.
Tr. catechu, ... f℥j.
Extr. ergotæ fl., ... q. s. ad f℥ij.

M. Sig.: A dessertspoonful every hour or two.

The infusion, however, is usually the most efficient preparation in hæmorrhage :—

℞ Plumbi acetatis, ... gr. xl.
Morphinæ acetat., ... gr. j.
Infus. digitalis, ... f℥iv.
M. et ft. sol.
Sig.: Tablespoonful every three hours.

Digitalis may also be prescribed for hæmorrhage in phthisis and in the first stage of pneumonia, thus :—

℞ Extracti digitalis, ... gr. iij.
Pulveris ipecacuanhæ comp., ... gr. xxiv.
M. et ft. pil. no. xij.
Sig.: A pill every two or three hours.

In exophthalmic goitre and in congestive headaches, it sometimes succeeds remarkably in controlling the symptoms of disease.

Besides the special action above referred to, as a cardiac tonic or current regulator to the circulation, digitalis is the chief reliance in dropsy and serous effusions, owing to its diuretic action. In acute renal dropsy the best effects are obtained by combination with calomel or other mercurial, and with squill, as in the famous Guy's pill :—

℞ Pulv. digitalis, ... gr. ss.
Pulv. scillæ, ... gr. iss.
Mass. hydrargyri, ... gr. iij.
M. et ft. pil.
Sig.: Take one or two at bed-time.

In cases of œdema due to Bright's disease, with scanty albuminous urine, the following are useful :—

℞ Potass. acetat., ... ʒvj gr. xl.
Spiritus juniperi, ... f℥iss.
Inf. digitalis, ... q. s. ad f℥v.
M. Sig.: A dessertspoonful every three hours.

℞ Infus. digitalis,
Infus. scoparii,
Infus. buchu, ... āā f℥ij.
M. Sig.: A dessertspoonful every three hours.

℞ Infus. digitalis,
Infus. taraxaci,
Spiritus ætheris nitrosi, ... āā f℥ij.
M. Sig.: A dessertspoonful every three hours.

In menorrhagia, hæmoptysis, and in the hæmorrhagic diathesis, the tincture of digitalis is usefully given in doses of 20 to 30 minims. The same doses may be given in cases of surgical shock or syncope. Sper-

matorrhœa with nocturnal emissions is benefited by digitalis in combination with ergot or with bromide of potassium, according to circumstances. In this country it is not used for its antipyretic effect, although in Germany it has been given in the hyperpyrexia of rheumatism and scarlet fever. The infusion of digitalis is employed in the treatment of scarlatina, especially when the urine becomes scanty. The following combinations are very serviceable in the latter condition :—

℞ Inf. digitalis,
Spiritus ætheris nitrosi, ... āā f℥ss.
Potassi bitartratis, ... ʒij.
M. Sig.: A teaspoonful in water every three or four hours.

℞ Inf. digitalis,
Misturæ potassii citratis, ... āā f℥ij.
M. Sig.: A teaspoonful every two or three hours.

Digitalis should be given with great care, if at all, to persons with fatty degeneration of the heart and dilatation. It should not be given in pericarditis, although passive pericardial effusion may be removed without much danger. In simple hypertrophy or compensating hypertrophy, or conditions of high arterial tension or vascular excitement, it should rarely, if ever, be given. In any disease accompanied by changes in the heart-muscle or atheroma of the blood-vessels, digitalis should not be prescribed except for a temporary emergency. In dilatation of the heart, however, this remedy serves an excellent purpose. In typhoid fever, digitalis is liable to increase the diarrhœa and cause vomiting. In gastritis or acute nephritis, it would also prove injurious. In fibroid lung, digitalis lessens the cough, steadies the heart, and reduces œdema. It has been successfully employed in erysipelas. Digitalin should not be prescribed on account of the uncertainty of its action, the smallness of the dose of the leaves rendering it unnecessary.

Digitalis is the physiological antidote to muscarine and to aconite, but requires the aid of diffusible stimulants on account of its slowness of action, when treating cases of poisoning by these agents. It may be administered hypodermatically in such cases in combination with whisky, and in surgical shock as recommended by Dr. Thomas G. Morton, of the Pennsylvania Hospital.

DIOSCOREA VILLOSA.*—Wild Yam.

Preparations.

Decoctum Dioscoreæ.—Decoction of Dioscorea. *Dose*, f℥i–iv.
Tinctura Dioscoreæ.—Tincture of Dioscorea. *Dose*, ♏x–lx.
Extractum Dioscoreæ Fluidum.—Fluid Extract of Dioscorea. *Dose*, ♏v–xxx.

* See paper by the author, in Journal of the American Medical Association, Sept. 21, 1889.

Pharmacology.—Dioscorea villosa (Dioscoreaceæ), wild yam or colic root, grows abundantly in our Southern States, but less plentifully in the Northern and Western States. The part made use of is the root. This is without odor when intact, but when bruised develops a slightly woody smell. The taste is somewhat pungent and sweetish-bitter. The powdered root is yellowish-gray in color, is soluble both in water and alcohol.

The root contains an active principle called **Dioscorein,** to which it chiefly owes its medicinal virtues. The physiological action of the drug has never been systematically studied.

Therapy.—Wild yam possesses diaphoretic and expectorant properties, but derives its principal value from its effect upon the hepatic functions. In large doses it is emetic. It is of especial service in the treatment of gall-stone. It quickly relieves pain and spasm, and, provided the calculus or calculi are not of extreme size, leads to their prompt expulsion. After the concretions have passed into the bowel this remedy is of service in reducing the congestion or inflammation which they have caused.

A yellowish discoloration of the skin and conjunctiva, joined with colicky pain and nausea, suggests the employment of dioscorea. Hepatic indigestion, with its train of evil consequences, is effectually relieved by the fluid extract in 15-drop doses before meals. The same preparation effects a marked improvement and gradual cure in chronic congestion of the liver.

In chronic malaria this agent is of decided advantage, and may be combined with arsenic, quinine, or nux vomica, as follows:—

℞ Liq. potass. arsenit.,	f℥j.
Tinct. dioscoreæ villosæ,	f℥ss.
Tinct. cardamomi comp.,	f℥iss.

M. A teaspoonful in water after meals.

In chronic gastritis the result of alcoholic excess, wild yam is very serviceable and may be prescribed thus:—

℞ Tinct. belladonnæ,	♏xxiv.
Tinct. nucis vomicæ,	f℥j.
Tinct. dioscoreæ villosæ,	f℥ss.
Syrupi zingiberis,	f℥iss.

M. Teaspoonful in water every fourth hour.

The progress of cirrhosis of the liver seems to be delayed by the administration of wild yam, which is at least as efficient in this disease as the mercuric chloride. Furthermore, the addition of dioscorea increases the analgesic effect of morphine in hepatic carcinoma.

DITA.—Dita-Bark.

Dose, ℥i–iv, best given in the form of a fluid extract.

Dita-bark (Apocynaceæ) is from the East Indian Archipelago. It contains two bitter alkaloids, **Ditain** and **Ditamine,** and has been used as an antiperiodic in treatment of ague.

DRACONTIUM.—Dracontium, Skunk-Cabbage.

Dose, gr. x–℥j.

Pharmacology.—The root of Dracontium fœtidum (Araceæ), a small plant of North America, has acid properties, and, when fresh, a very disagreeable smell, which warrants its common name. Besides this volatile principle the drug contains a resin, tannin, etc.

Therapy.—It is regarded as an antispasmodic, and has been used in chorea and hysteria, asthma and chronic catarrh, using the recently dried root or a good fluid extract ($\frac{2}{3}$ alcoholic).

DROSERA.—Drosera, Sundew.

Pharmacology.—The Drosera rotundifolia (Droseraceæ), growing in Europe and North America, has a very limited use in medicine. The whole plant is used, and a recent infusion or fluid extract is the best method in which to administer it. It contains a resin and a peculiar acid.

Physiological Action.—Drosera is irritating to the skin, and the juice is used as an application for corns or warts. Internally, it is expectorant.

Therapy.—It is used in chronic bronchial catarrh, and has some reputation in the treatment of phthisis. In spasmodic affections of the chest, whooping-cough, and paroxysmal asthma it is said to be serviceable. Three or four ounces of the expressed juice have been given during the day, but this probably did not contain the acrid resin. The fluid extract, in doses of ♏v–xv, is the best preparation.

DUBOISIA.—Duboisia.

Preparations.

Tinctura Duboisiæ.—Tincture of Duboisia. *Dose,* ♏v–x.

Extractum Duboisiæ Fluidum.—Fluid Extract of Duboisia. *Dose,* ♏x–xx.

Extractum Duboisiæ.—Extract of Duboisia. *Dose,* gr. $\frac{1}{6}$–$\frac{1}{2}$.

Duboisinæ Sulphas vel Hydrobromas.—Sulphate or Hydrobromate of Duboisine. *Dose,* gr. $\frac{1}{150}$–$\frac{1}{30}$.

Pharmacology.—The portion of the Duboisia myoporoides (Solanaceæ), a large Australian tree, which is used in medicine is the leaves, which have a bitter, acrid taste, but very slight odor, and contain an alkaloid, **Duboisine,** closely resembling atropine, and identical with hyoscyamine. The sulphate of duboisine is a yellowish, soft, gum-like mass, soluble in water.

Physiological Action.—The effects of duboisia are the same as those of belladonna, although, on account of its greater solubility, its effects are manifested more quickly and pass away sooner than those of belladonna.

Therapy.—It is used in medicine for the same purposes as belladonna, and is antagonistic to morphine. In ophthalmology a solution of 1 per cent., or 4 grains to the ounce of distilled water, may be instilled for making examinations, etc. Its effects upon the pupil pass off more quickly than a similar solution of atropine. Various nervous disturbances occasionally follow the use of a collyrium containing duboisine,—faintness and strange sensations in the head, as in Dr. Seely's case, and a feeling of impending death, giddiness, pain over the heart, and hallucinations, as in a case reported by Aubone.*

DULCAMARA (U. S. P.).—**Dulcamara, Bitter-Sweet.**

Preparations.

Extractum Dulcamaræ Fluidum (U. S. P.).—Fluid Extract of Dulcamara. *Dose*, ♏xxx–fʒj.

Extractum Dulcamaræ.—Extract of Dulcamara. *Dose*, gr. v–x.

Pharmacology.—The young branches of Solanum dulcamara (Solanaceæ) are officinal and also a fluid extract. A decoction may be made (1 to 16) and given in doses of f℥ss–iij. A bitter, amorphous substance exists in this plant, which, upon being decomposed, yields a bitter alkaloid, **Solanine,** crystallizing in white needles, readily soluble in alcohol, less soluble in water; its salts are soluble in either alcohol or water.

Physiological Action.—Eruptions upon the skin attended by duskiness and itching are among the effects of poisoning, which is likely to occur in children, from eating the berries. It also causes vomiting, dizziness, convulsive attacks, abdominal pains, thirst, heat and dryness of throat, rapid respiration and pulse, and prostration of vital powers. In the ordinary doses it does not produce these effects, but acts as a sedative and mild narcotic. The treatment in cases of overdose would be large amounts of warm water to wash out the stomach, and hypodermatic injections of morphine and atropine, with ether or alcohol.

Therapy.—Dulcamara is seldom used at present, although it is believed to be serviceable in chronic skin affections of a scaly character. The recent decoction may be used as a diaphoretic in rheumatism, or acute bronchitis and colds. The extract may be given in mania, and especially nymphomania or satyriasis.

* Medical Bulletin, January, 1890, p. 14.

ELATERINUM (U. S. P.).—**Elaterin.**
Dose, gr. $\frac{1}{20}$–$\frac{1}{12}$.

Preparation.

Trituratio Elaterini (U. S. P.).—Trituration of Elaterin. *Dose,* gr. $\frac{1}{2}$–$\frac{3}{5}$

Pharmacology.—The fresh, expressed juice of the fruit of Ecbalium elaterinum (Cucurbitaceæ), upon standing, deposits a peculiar, resinous substance, which is collected upon muslin and dried, forming flat pieces of variable thickness and irregular shape, of a pale-green or grayish color, mostly amorphous, but containing some crystals. This constitutes commercial, and formerly officinal, elaterium. Elaterinum exists in the proportion of from 15 to 40 per cent. in elaterium, and on account of this variability in strength the latter has been dropped from the Pharmacopœia, and the more reliable elaterin substituted. The elaterin is extracted from elaterium by chloroform and precipitated from the chloroform solution by the addition of ether, in which it is nearly insoluble. In prescribing, elaterin must not be dispensed for elaterium, as it is from two to six times stronger. Elaterin is crystalline, odorless, intensely bitter and acrid, soluble in chloroform, fusel-oil, or bisulphide of carbon, and in 125 parts of alcohol. It is a neutral substance, and is not precipitated by tannic acid or by salts of mercury.

Physiological Action.—It is violently purgative, causing profuse, watery stools with griping, and in large doses producing great prostration. Death has resulted from excessive doses. Dangerous symptoms require demulcents, opiates, and stimulants. It must be used with caution in elderly persons. It purges when injected hypodermatically, but to obtain its full effects it must be mixed with the bile. It also occasions an excessive flow of saliva.

Therapy.—In ascites, uræmia, cerebral congestion, pulmonary œdema, and poisoning by narcotic substances, elaterin affords a ready means of evacuating the bowels, and of reducing the volume of circulation by draining water from the vessels, or "bleeding through the tissues." It should not be given for ordinary constipation, as it is too depressing. On account of its great activity a small fraction of a grain may produce collapse from hypercatharsis. The trituration, therefore, in which the drug is reduced by triturating it with 9 parts of sugar of milk, is an eligible and useful preparation. According to Dr. Hyde Salter, a small dose of elaterium, given on alternate mornings, is of value in dropsy dependent on aortic disease.

ELEMI.—**Elemi.**

Pharmacology.—The Canarium commune (Burseraceæ), a tree of the Philippine Islands and the southern portion of the American continent,

affords an oleoresin, obtained from incisions into the living bark. This substance, somewhat resembling granular honey when fresh, becomes more solid and friable when kept for some time. The taste is rather pungent and bitter. It contains 60 per cent. of amorphous resin, **Brein**; 25 per cent. of crystallizable resin, **Amyrin**; about 10 per cent. of a volatile oil, besides a crystallizable, bitter, acrid substance, **Bryoidin**; also, brëidin and elemic acid.

Physiological Action.—It has stimulating and irritating properties, and is only used as an ingredient in plasters and ointments, or for use externally. It is similar to other terebinthinate agents in its effects. The British Pharmacopœia recognizes an ointment of elemi, composed of $\frac{1}{4}$ ounce of elemi and 1 ounce of simple ointment.

Therapy.—Used as an application to enlarged joints, and as a resolvent to swollen glands. It may also be applied to indolent ulcers, and is a good dressing for burns, blisters, and chilblains.

EMBELIA RIBES.—Babarang.

Dose, ʒi–iv.

Pharmacology and Therapy.—The Embelia ribes (Myrsineæ) is a climbing plant of Southern China, Eastern India, and Malaya. The dried and powdered fruit is used, or the fluid extract of the fruit (dose, fʒi–iv). It is an efficient anthelmintic and tæniacide; is believed to be a specific in rheumatism; and is an alterative in chronic skin diseases. In cases of flatulent dyspepsia it is claimed to be serviceable. The active principle was found to be an acid, which has been named **Embelic acid** (Warder), and is insoluble in water. It forms salts with soda, potash, and ammonia, the latter being most readily obtained crystalline. This ammonium salt was found effective as an anthelmintic against tænia, in doses of 6 grains for adults, or 3 for children. It is administered in syrup, to be followed by castor-oil; it has the advantages over male fern of smallness of dose and tastelessness. It kills the worm. The powdered seeds may be given with milk early in the morning, fasting, followed by a purgative some hours later. The dose of the powder for a child is a teaspoonful twice a day as a tæniacide, or about the same quantity of a fluid extract.

EPHEDRA.—Ephedra, Mormon Tea.

Pharmacology.—The stems or the whole herb of Ephedra antisyphilitica (Gnetaceæ?) is used in Arizona as a recent infusion, or in the form of fluid extract (dose, fʒi–ij) as an alterative, and especially in treatment of gonorrhœa and syphilis. It contains a peculiar kind of tannin, to which its effects are probably attributable, according to Professor Oscar Loew's analysis; although in a Japanese variety, E. vulgaris, Professor Nagai discovered an alkaloid, which he named **Ephedrin.**

Therapy.—Dr. H. H. Rusby* is satisfied that the reputation of this drug as a remedy in gonorrhœa and in syphilis has some solid foundation. As an antiblennorrhagic its action is probably very similar to that of astringents now in use. As a remedy in syphilis, he says, its value is, probably, solely that of a depurative. In the removal from the system of the accumulated products of the disease, ephedra will take rank with any agent now in use, with the single exception of potassium iodide, and it may well serve to alternate or combine with that drug. It is also considered by persons living in the region of its growth to be a "sure and speedy cure for skin diseases."

EPIGÆA.—Epigæa, Trailing Arbutus.

Dose, ʒss–ij, in infusion or fluid extract.

Pharmacology.—The Epigæa repens (Ericaceæ) is a small, herbaceous plant, with sweet-smelling flowers. The part used is the leaves, which are odorless, bitter, and astringent. They contain **Arbutin, Ursone,** and tannic acid.

Therapy.—The constituents of the plant are very much the same as those of Uva ursi, and its uses are similar. It is given as an astringent in vesical catarrh, blennorrhœa, etc.

ERGOTA (U. S. P.).—**Ergot of Rye.**

Dose, gr. x–ʒj.

Preparations.

Extractum Ergotæ Fluidum (U. S. P.).—Fluid Extract of Ergot. *Dose,* ♏x–fʒij.

Extractum Ergotæ (U. S. P.).—Extract of Ergot. *Dose,* gr. v–x.

Vinum Ergotæ (U. S. P.).—Wine of Ergot (15 per cent.). *Dose,* fʒj–f℥j.

Ergotin.—A mixture of constituents of varying strength and physiological action, best represented by the officinal extract.

Pharmacology.—Ergot is the compact spawn or sclerotium of the Claviceps purpurea (Fungi) replacing the grain of Secale cereale (Graminaceæ). The rye-ergot is the only one officinal, although it affects other grasses. The Ustilago maidis of corn is very similar in chemical composition and effects. Ergot is in grain-like masses, from 1 to 2 inches long and about ⅛ inch thick. The grains are nearly triangular, somewhat curved, and marked lengthwise by three grooves, thickest in the middle and tapering toward each end; of a dark-purplish color externally, they are nearly white in the centre. They have a heavy, unpleasant odor and a fatty, mawkish, disagreeable taste. The addition of a strong alkali develops an odor like that of herring-brine (trimethylamine). It contains about 35 per cent. of fixed oil, a peculiar sugar, and two coloring matters. Chemists have isolated or derived a number of more or less

* Druggists' Bulletin, 1888, p. 220.

active principles from ergot, the most prominent being **Sclerotinic acid** (Dragendorff), **Scleromucin,** and **Trimethylamine;** but, according to Kobert, sclerotinic acid is itself a compound body, of which ergotinic acid is the largest constituent. **Sphacelinic acid** and **Cornutin,** according to this authority, represent the portion of the drug causing ergotism, the former producing gangrenous ergotism through its action upon the blood-vessels and vasomotor centres, the latter causing convulsive ergotism having a special action upon the nerve-centres. Cornutin is also held by him to be the principle which acts upon the uterus, causing contraction of its muscular fibres. None of these so-called principles, singly, represent the physiological activity of the drug; which, however, can be nearly substituted by the combination of them in the aqueous extract, or ergotine, or a good fluid extract, which is the most reliable form in which to use it. When kept for some time ergot loses its virtues, and should be as fresh as possible in order to be effective. A substance similar in composition to cholesterin, and therefore termed ergosterin, has been extracted from ergot by C. Tanret.

Physiological Action.—No local effects are observed from application of ergot to the skin; upon mucous membranes it acts as an astringent. Upon the nervous system little effect is produced directly, although in ergotism we have convulsions and other nervous symptoms, caused indirectly. It induces anæmia of nerve-centres by exerting a selective action upon their blood-vessels, which it causes to contract. When introduced into the circulation, there is, first, a fall of blood-pressure, soon followed by a rise; the primary fall is most marked where a large amount comes in contact with the heart-muscle, which is depressed by it, and paralysis of the heart may cause death after intra-venous injection of ergot. The rise of blood-pressure represents the physiological stimulating action of the drug upon the vasomotor centres and upon the unstriped muscular fibres in the arterioles. The effects of ergot upon the parturient uterus are those of a stimulant to the contractions, increasing their force and frequency until the full action is brought about of tetanic contraction of the organ. Upon the non-parturient uterus the effects are more marked in checking the blood-supply. The lower animals abort after eating ergotized grain, and in some States there are laws against the administration of ergot to pregnant women in order to produce miscarriage; but such result does not follow the use of ergot in ordinary medicinal doses, although in chronic ergotism this accident may occur.

Toxic Effects.—When an overdose is administered, effects result which are known collectively as **acute ergotism.** The symptoms are peculiar restlessness, with anxiety, headache, vertigo, dilated pupils, tinnitus

aurium, with hyperacusis, the action of the heart is slowed, the pulse is weak, respirations reduced in frequency, and, as the effects increase in intensity, suddenly nausea and vomiting occur, even when the drug is introduced hypodermatically. This cerebral vomiting is distinct from the local effects of the drug when taken by the mouth, when vomiting may occur early if the stomach is very sensitive.

Chronic ergotism occurs in regions of the country, notably in Europe, where rye-bread is the staple food, in seasons when ergot is most present in the grain. It appears in two forms, the convulsive and the gangrenous: the former being characterized by vertigo, dimness of vision, and numbness of the extremities, followed by tonic contractions particularly of the flexor groups of muscles. Attacks of dyspnœa also occur, resembling asthma, caused by tetanoid contractions of the respiratory muscles. Cramps of abdominal muscles, colic, and diarrhœa take place; the pulse is slow and weak; the surface of the body is cold; the symptoms increase in intensity; the special senses are affected; hearing and smell are lost; the pupils are permanently dilated, and vision is impaired. The case may be terminated by clonic convulsions or death result from exhaustion. The gangrenous form is marked by the intensity of the local phenomena: the numbness of the fingers and toes terminating in vesications, and moist or dry gangrene, more or less extensive, destroys these parts, or may affect the nose or other portions of the body. It is evident that in chronic ergotism there is a profound dyscrasia, perhaps attributable as much to the unhygienic mode of life and poor food as it is to the toxic effects of ergot. Such grave effects are not observed from the medicinal administration of ergot, even when continued for a long time.

Treatment of Poisoning.—The phenomena of acute ergotism are easily controlled by placing the patient in a hot bath and administering cardiac and arterial stimulants, such as coffee. Amyl nitrite, aconite, veratrum viride, and tobacco antagonize the effects of ergot upon the circulation. The treatment of chronic ergotism is mainly hygienic and symptomatic.

Therapy.—Ergotin made into a paste with water has been employed locally in conjunctivitis, gonorrhœa, endocervicitis, acne rosacea, and incipient boils. Ergot is valuable in hæmorrhoids, prolapsed rectum, and relaxation of the sphincter ani, when applied upon a tent or introduced as suppositories. Incontinence of urine, due to relaxed sphincter, is cured by ergot given in this manner, or administered by the mouth.

Chronic follicular pharyngitis is sometimes improved by the topical application of the fluid extract, or of ergotin in the proportion of 10 to 20 grains to the ounce. The oil of ergot is a valuable local medicament

in seborrhœa, removing the sebaceous material, and, at the same time, by its astringent and stimulant action, benefiting the diseased follicles and glands. Locally, in the diseases referred to, ergot may be prescribed according to the appended formulæ :—

℞ Ergotinæ,	ʒss.
Cocainæ hydrochloratis,	gr. v.
Plumbi carbonatis,	ʒss
Ungt. aquæ rosæ,	℥ss.

M. For external use in acne rosacea and in boils.

℞ Ergotinæ,	ʒj.
Sulphuris sublimati,	ʒss.
Mentholi,	gr. v.
Ext. belladonnæ alc.,	gr. x.
Ungt. zinci oxidi,	℥ss.

M. Valuable in fissures of the nose, mouth, rectum, and in hæmorrhoids.

℞ Ergotinæ,	gr. v.
Camphoræ,	gr. x.
Ext. opii,	gr. iiss.
Plumbi acetatis,	gr. xx.
Ol. theobromæ,	q. s.

M. et ft. suppositoriæ no. x.

Sig.: Insert one in the bowel when necessary for prolapsed rectum, diarrhœa, or for fissure of rectum.

℞ Extracti ergotæ fl.,	
Extracti hamamelidis fl.,	āā f℥iss.
Glycerini,	f℥j.

M. Sig.: Apply several times a day for chronic pharyngitis and nasal catarrh.

℞ Olei ergotæ,	f℥iij.
Lanolini,	℥j.
Ol. verbenæ,	♏v.
Ol. rosæ,	♏iij.

M. Sig.: Rub into the scalp well once or twice a day for dandruff. Useful, also, in loss of hair and sycosis.

Ergot is a reliable remedy in the several forms of capillary hæmorrhage, and in overcoming the congestion attendant upon and causing the oozing. In hæmoptysis, epistaxis, hæmaturia, bloody discharges from the bowels (melæna), and in uterine hæmorrhage, ergot in half-drachm doses of the fluid extract, repeated every hour or two, will generally promptly cause cessation of the bleeding. Ergot may be prescribed for various hæmorrhages with advantage, combined with geranium and witch-hazel :—

℞ Extracti ergotæ fl.,	f℥iss.
Extracti geranii fl.,	f℥j.
Extracti hamamelidis fl.,	f℥iss.

M. Sig.: A teaspoonful or two every half hour or hour until bleeding ceases.

In severe cases of hæmoptysis, in post-partum hæmorrhage, and hæmatemesis, a better practice is to administer the fluid extract or ergotin by subcutaneous injection. The same method is preferable when ergot is used in the treatment of fibromyomata of the womb, and may be resorted to in order to check the intestinal hæmorrhage of typhoid fever. Where uterine hæmorrhages are due to submucous polypi or fibromyomata, ergot not only checks the hæmorrhages, but causes the separation and expulsion of the growth; in such cases the progress of the treatment should be accelerated by dilatation of the cervix uteri, incision into the capsule, if one exists, and removal of the growth by surgical operation. In multipara, where there is a history of flooding after previous labors, full doses of ergot should be given just before the delivery of the child. The usual rule for the administration of ergot is to wait until the child's head is upon the perineum before giving it; otherwise there may be hour-glass contraction, or tetanic contraction with unyielding os, and the child's life be endangered. The administration of a drachm of fluid extract of ergot, after labor has terminated, prevents relaxation of the organ and the formation of large clots which cause after-pains. In night-sweats, ergot may be given alone in full doses, or combined with picrotoxin or atropine. Ergot is often of avail in hyperidrosis It is efficacious in all varieties of purpura, and in severe cases of the hæmorrhagic form may very properly be hypodermatically injected. This drug is of value in the treatment of chronic diarrhœa and dysentery. Good results have also been obtained from the administration of the fluid extract of ergot in acute dysentery alone or combined :—

℞ Extracti ergotæ fl.,	
Extracti hamamelidis fl.,	āā f℥iss.
Elix. guaranæ,	f℥ij.

M. Sig.: Two teaspoonfuls in water every two or three hours.

In passive or hypostatic congestion of the lungs, it may be combined with digitalis with advantage :—

℞ Ergotinæ,	gr. iv.
Extracti digitalis,	gr. iij.
Pulv. ipecacuanhæ co.,	gr. xxiv.

M. et ft pil. no. xij.
Sig.: A pill every three or four hours.

℞ Ergotinæ,	gr. xv.
Glycerini,	
Aquæ destillatæ,	āā fℨj.
Aquæ acidi carbolici,	♏xxx.

M. Sig.: Inject, hypodermatically, from 20 to 30 minims from two to four times a day in hæmoptysis.

In diabetes insipidus the fluid extract of ergot produces marked effect on the disease, having a decided influence in controlling the urinary excretion of water. It is serviceable in congestive dysmenorrhœa, paralysis of the bladder, and the congestive form of migraine. Varicose veins are restored to their normal calibre by hypodermatic injections of ergotin, and Bartholow strongly recommends this mode of treatment as efficacious in varicocele. The needle should be thrust among the enlarged veins in such a manner as not to wound their walls. Injected into the neighborhood of an aneurism, or administered by the mouth, ergot proves valuable by favoring the coagulation of blood within the sac. Enlarged spleen may be reduced by the same methods. Ergot combined with iron has very often a beneficial action in this same affection :—

℞ Extracti ergotæ fl.,
Tincturæ ferri chloridi,
Glycerini, ... āā f℥j.

M. Sig.: From one to two teaspoonfuls in water three or four times a day.

In some skin diseases, notably acne rosacea, the internal administration of ergot conjoined to local measures is of advantage.

From its effects upon the vascular supply of the spinal cord, Brown-Séquard has proposed its use in some forms of paraplegia attended by signs of local irritation and hyperæmia of the cord. It is useful in congestive headache and in chronic mania, and has been used with asserted good result in spermatorrhœa and incontinence of urine.

ERIGERONTIS OLEUM (U. S. P.).—**Oil of Erigeron, Canada Fleabane.**

Dose, ♏xx–xxx.

Pharmacology.—A volatile oil distilled from the fresh flowering herb of Erigeron Canadense* (Compositæ). It is an amber-colored liquid, with slightly-pungent taste and characteristic aromatic odor, resembling that of turpentine. It has diuretic and hæmostatic properties. The fluid extract (alcoholic) is also used. Dose, f℥i–ij.

Therapy.—The oil of erigeron is very efficient in cases of uterine hæmorrhage (metrorrhagia), especially when of passive character. Menorrhagia may likewise be checked by the exhibition of this remedy. It has also been used in controlling other hæmorrhages, such as epistaxis, and hæmorrhage from the bowel is similarly controlled by the oil of

* Prof. J. Foster Flagg, in his lectures at the Philadelphia Dental College, recommends the dried flowering herb of erigeron as a good local styptic for bleeding of the skin, especially from cuts after shaving. He also gives two drops of a tincture made by absolute alcohol two or three times a day as an antihæmorrhagic. One or two drops of this same tincture of erigeron in half a teaspoonful of water is likewise given by Dr. Flagg for acute hæmorrhage every minute to a half hour, or as indicated.

erigeron, which has proved successful likewise in dysentery. This remedy may be given simply dropped upon sugar, in an emulsion, or in capsules. It has also some influence over the genito-urinary mucous membrane, and is useful in the declining stage of gonorrhœa.

ERIODICTYON.—Eriodictyon, Yerba Santa.

Preparations.

Extractum Eriodictyi Fluidum.—Fluid Extract of Yerba Santa. *Dose*, ♏xv–xxx.

Extractum Eriodictyi.—Extract of Yerba Santa (made by evaporating the fluid extract to a pilular consistency). *Dose*, gr. iii–xv.

Pharmacology.—The leaves of the Eriodictyon glutinosum (Hydrophyllaceæ), of California, have a fragrant odor and an aromatic, sweetish taste, and contain an acrid resin and a volatile oil. The effects are most evident in the bronchial mucous membrane, to which it is a stimulant and expectorant.

Therapy.—Yerba santa has a reputation in the treatment of bronchitis, laryngitis, and consumption. It has likewise been found beneficial in asthma, and may be very well administered in conjunction with grindelia robusta. It is used as a vehicle for the administration of quinine. the bitterness being overcome by the aromatic principles of the plant, Messrs. Parke, Davis & Co., who introduced this remedy to the profession, provide an aromatic syrup of yerba santa, of which a teaspoonful completely masks the bitterness of 2 grains of quinine sulphate.

℞ Quininæ sulphatis,	gr. xlviij.
Ext. belladonnæ fl.,	♏ij.
Syrupi eriodictyi aromat.,	q. s. ad f℥iij.

M. Sig.: A teaspoonful four times daily in laryngitis or chronic bronchitis.

ERYTHROPHLŒUM.—Erythrophlœum. See Casca Cortex.

ERYTHROXYLON (U. S. P.).—**Erythroxylon. Coca,** or **Cuca.**

Preparations.

Extractum Erythroxyli Fluidum (U. S. P.).—Fluid Extract of Erythroxylon. *Dose*, ♏x–f℈j.

Extractum Erythroxyli.—Extract of Erythroxylon. *Dose*, gr. iii–xv.

Vinum Erythroxyli.—Wine of Coca. *Dose*, f℥ss–iv.

Cocaina.—Cocaine.

Cocainæ Hydrochloras.—Hydrochlorate of Cocaine. *Dose*, gr. ¼–ij.

Cocainæ Oleas.—Oleate of Cocaine.

Pharmacology.—Coca or cuca leaves, taken from the Erythroxylon coca (Erythroxylaceæ), a small tree of Peru and Bolivia, contain a crystallizable alkaloid, **Cocaine**; a second alkaloid, **Hygrine**, which is liquid and volatile; and probably a third, also volatile, and only found in the recently-dried leaves, resembling the volatile oil in tea, the effects of which, and those of coca, are analogous. Coca-leaves are chewed

by the natives to sustain their strength during long journeys and to invigorate them when fatigued, and the reports of travelers establish the truth of the observation, that with the assistance of a small quantity of the leaves they can endure privation from food and perform remarkable feats of endurance. The fact that the same effects cannot be obtained in this country from the imported dried leaves makes it probable that the fresh leaves contain a volatile principle of considerable physiological activity, which is lost after a sea-voyage, by partial fermentation and drying, as maintained by Dr. H. H. Rusby. They also contain coca-tannic acid and some oil, aromatic and coloring matters, etc.; but cocaine is the most important constituent. As cocaine is decomposed into benzoic acid and ecgonine by the action of mineral acids, these should not be prescribed with the fluid preparations made from coca-leaves.

Physiological Action.—Coca and, to a marked degree, cocaine cause local numbness or anæsthesia when applied to mucous membranes and when injected hypodermatically. When cocaine is applied to the conjunctivæ, sensibility is reduced, the pupils become dilated, and the accommodation impaired; it constricts the blood-vessels, diminishes the intra-ocular tension, causes enlargement of the palpebral fissure and protrusion of the eyeball. When applied to the tongue, it causes numbness and loss of tactile sensibility without affecting the movements. The application of cocaine to the pharynx, or larynx, and nasal chambers, reduces the sensibility so as to permit manipulation or operation, and also by its effect upon blood-vessels reduces congestion and inflammation. Taken in small doses frequently repeated, coca acts as a general tonic and prevents waste. In somewhat larger doses it is a nerve-stimulant, increasing the blood-supply to the nerve-centres; improves the digestive powers, increases the force of the heart's action and arterial tension by its influence upon the vaso-motor centres and cardio-motor ganglia. It also gives a sense of well-being that enables the organism to bear more fatigue and to sustain the powers of the body with less food or less sleep than usual. Coca increases the flow of urine, but the quantity of urea is lessened; it thus acts as an indirect food by preventing waste. After an overdose the pulse becomes rapid and weak, respiration is labored and shallow, and oppression of the chest is complained of, with threatening collapse, clammy skin, hallucinations, and delirium. Clonic convulsions of cerebral origin are occasioned and the bodily temperature markedly increased. Death is due to the paralysis of the heart, the spinal centres, or the centres in the medulla. Diarrhœa is produced by large doses, with headache (Hammond).

Poisoning.—The treatment is the same as for toxic doses of caffeine. Morphine, atropine, chloral, amyl nitrite, and chloroform, alcohol or

ether are physiological antidotes. In some cases toxic effects have apparently been produced, with great depression and imminent collapse, by extremely minute doses, as where cocaine is used as a mydriatic, or applied to the throat. They can only be explained by idiosyncrasy, and the symptoms usually promptly disappear after the administration of stimulants, or the inhalation of ammonia or ether. A form of protracted acute cocainism has been lately described by Hallopeau, who has, in several instances, observed the injection of a single small dose to produce distressing symptoms, which may endure for several months. These symptoms bear much resemblance to those which immediately follow the injection, and consist, above all, of persistent headache, accompanied by profound malaise, insomnia, numbness of the limbs, vertigo, syncope, mental excitement, and loquacity.* **Cocainism,** or the evil results from constantly resorting to this drug as a stimulant, requires moral treatment more than medicinal; possibly the addiction may be, in some cases at least, the first manifestation of insanity. Cocaine is eliminated by the kidneys, much of it, however, being oxidized within the system.

Therapy.—The introduction of cocaine to the profession as a local anæsthetic is due to Dr. Koller, who first called attention to its usefulness in eye-surgery in 1884. Since then its influence in causing local anæmia and dilatation of the pupil having been discovered, it is now one of the necessary drugs in eye-practice (a 4-per-cent. solution being the usual strength employed, as first recommended by Koller). Anæsthesia of the conjunctiva results in from one to five minutes after instillation of a solution of cocaine. Dilatation of the pupil does not occur until ten or twenty minutes after the instillation; it continues for about an hour, and then gradually disappears. Though impaired, the accommodation is not paralyzed, and is restored while the pupils yet remain dilated. The conditions of the eye in which cocaine is particularly applicable are diseases of the conjunctiva and cornea, accompanied by pain and photophobia. By its local anæsthetic properties it facilitates many of the operations upon the eye. The removal of foreign bodies imbedded in the cornea, the excision of pterygium, the cauterization of corneal ulcers, dilatation of the lachrymal canal, the operation for strabismus, staphyloma, or chalazion, iridectomy, and extraction of the lens may all be accomplished by the aid of cocaine anæsthesia. It is not so well adapted for use when enucleation of the eyeball is to be performed, though this operation may be done when the alkaloidal solution is injected deeply around the orbit. Mr. Leahy has found cocaine serviceable in gonorrhœal ophthalmia. He incorporates $\frac{1}{2}$ grain of the sulphate of atropine and 4 grains of sulphate of cocaine in 100

* La Tribune Médicale, December 4, 1890. Medical Bulletin, January, 1891.

grains of vaseline (lard or lanolin the writer suggests as a better vehicle for the absorption of the drugs incorporated), and applies the mixture beneath the upper lids. In aural surgery, a solution of cocaine may be introduced within the external meatus for the relief of acute and chronic purulent otitis, ulcers of the canal, or to render possible operative procedures within the tympanic cavity. The application of this solution to the lower nasal passages and the orifice of the Eustachian tube is a valuable assistance in catheterization of the tube through the nose. By injection of this remedy into the tube itself the inflation and injection of remedial liquids into the tube and the middle ear is rendered much easier of performance. In dental and nasal surgery this substance fulfills numerous indications. The local anæsthesia produced by cocaine permits operation for ingrown nails and the removal of intra-laryngeal tumors.

The rectal injection of a cocaine solution relieves the tenesmus and pain of dysentery. Used as an injection, or applied upon a pledget of cotton, cocaine allows many gynæcological operations to be painlessly performed. Vesico-vaginal fistulæ, laceration of the cervix uteri, and urethral caruncles have been successfully treated in this way without a resort to general anæsthesia. Cocaine likewise affords relief in vaginismus.

Dr. Corning, of New York, has shown that, by using the drug hypodermatically and confining it within limits, a degree of local anæsthesia can be obtained that permits of large operations, such as removal of tumors, extirpation of the breast, or amputation of a limb. It is used as an injection into the urethra in gleet and previous to passage of instruments or surgical operations. Cocaine is employed as a spray or in wafers with gelatin, in the throat or nose, for simple catarrh, pharyngitis, laryngitis, and for the relief of hay fever (4- to 20-per-cent. solution). Dr. Isidor Gluck avoids the toxic effects of a cocaine solution that sometimes ensues by using the following formula:—

℞ Phenol., ... ♏ij.
Aquæ destillatæ, ... f℥j.
M. et adde
Cocaine hydrochloratis, ... gr. x.
M. Phenol renders the solution aseptic and prevents absorption of the cocaine.

An ointment containing erythroxylon or hydrochlorate of cocaine is an admirable local remedy in affections characterized by severe pain or distressing itching. The extract of erythroxylon (gr. xxx–℥j) may be incorporated in an ounce of lard, or the salt of the alkaloid may be used in the proportion of 4 to 8 or 10 grains to the ounce, or as follows:—

℞ Extracti erythroxyli cocæ, ʒss.
Creasoti, ♏v.
Ungt. zinci oxidi, ℥j.
Ungt. plumbi subacetatis, ℥ss.
M. For subacute eczema or psoriasis.

℞ Cocainæ, gr. x.
Plumbi carbonatis, ʒj.
Pulveris marantæ, ʒj.
Ol. eucalypti, ♏iv.
Ungt. zinci oxidi, ℥j.
M. Useful in acute eczema, dermatitis, burns, and irritable ulcers.

℞ Cocainæ hydrochloratis, gr. xij.
Atropinæ sulphatis, gr. j.
Acidi carbolici, ♏v.
Ol. anthemidis, ♏iv.
Ungt. zinci oxidi, ℥j.
M. For herpes, herpes zoster, dermatalgia, and paræsthesia.

℞ Extracti erythroxyli cocæ, ʒj.
Zinci carbonatis, ʒij.
Camphoræ, gr. x.
Sulphuris sublimati, gr. xx.
Ungt. aquæ rosæ, ℥j.
M. For eczema around the genital organs.

℞ Cocainæ hydrochloratis, gr. x.
Mentholi, gr. x.
Bismuth. subnit., ʒj.
Ungt. zinci oxidi,
Lanolini, āā ℥ss.
M. Beneficial in urticaria, herpes, and herpes zoster.

℞ Cocainæ hydrochloratis,
Hydrarg. chloridi mitis, āā gr. x.
Zinci carbonatis, ʒj.
Beta-naphthol,
Camphoræ, āā gr. v.
Ungt. zinci oxidi, ℥j.
M. Valuable in infantile eczema.

These ointments are serviceable in dermatitis, acute eczema, dermatalgia, herpes zoster, paræsthesia, urticaria, burns, irritable and painful ulcers. Cocaine ointment allays the pain of ulcerated carcinoma and is beneficially applied to painful hæmorrhoids. On account of its astringent and slightly stimulant action, erythroxylon ointment is sometimes an efficient application in acne and rosacea. An anodyne ointment may be thus composed :—

℞ Cocainæ hydrochloratis, gr. x.
Morphinæ sulphatis, gr. ij.
Atropinæ sulphatis, gr. j.
Pulveris marantæ, ʒj.
Unguenti zinci oxidi, ℥j.—M.

In the treatment of burns the hydrochlorate of cocaine should be preferably mixed with lanolin, since the latter substance possesses undoubted efficacy in the treatment of this accident.

℞ Cocainæ,	gr. xv.
Lanolini,	℥iss.
Sodii bicarbonatis,	ʒij.
Ol. olivæ,	q. s.

M. et ft. ungt. mollis.

℞ Cocainæ,	gr. x.
Lanolini,	℥j.
Bismuthi subnit. vel plumbi carbonatis,	ʒij.
Ol. olivæ,	q. s.

M. et ft. ungt. mollis.

Cocaine is a valuable remedy in pruritus ani or vulvæ and in some cases of eczema. In rhus poisoning and erythema the solution of cocaine promptly relieves the burning pain. Cocaine can be employed in the form of a solution according to the following formulæ:—

℞ Cocainæ hydrochloratis,	gr. iij.
Plumbi acetatis,	gr. x.
Glycerini,	f℥iss.
Aquæ destillatæ,	f℥ivss.

M. Sig.: Use as an injection in the urethra in subacute and chronic gonorrhœa.

℞ Cocainæ hydrochloratis,	gr. ij.
Creasoti,	♏viij.
Glycerini,	f℥j.
Aquæ hamamelidis dest.,	f℥iij.

M. Sig.: Spray into the nose or throat in simple catarrh, pharyngitis, laryngitis, and in hay fever.

℞ Cocainæ hydrochloratis,	gr. iv.
Plumbi glyceroli,	
Aquæ hamamelidis dest.,	āā f℥ij.

M. Sig.: Apply over the surface on old muslin, for burning and itching of erysipelas, poisoning of the skin from various plants, and in sun-burn and superficial heat burns.

℞ Cocainæ hydrochloratis,	
Hydrastin. hydrochloratis,	āā gr. iij.
Aquæ rosæ,	f℥iv.

M. Sig.: Mop upon the skin or apply with old muslin or cotton, for seborrhœa oleosa, urticaria, acne, and rosacea.

In gastralgia, the use of cocaine, or of a hot infusion of coca-leaves, is often highly serviceable and yields prompt relief. The hydrochlorate of cocaine is an efficient remedy in nausea and vomiting. In the hands of Dr. Manassein it yielded excellent results in the incessant vomiting and collapse of cholera morbus. Prompt relief often follows its use in

migraine. In sea-sickness and the vomiting of pregnancy the alkaloid is often useful. In the latter condition it has been used by the mouth by injection into the epigastrium, or applied in ointment form to the os uteri. Mr. John Phillips afforded permanent relief by administration of the following mixture :—

℞ Cocainæ hydrochloratis, ...	gr. $\frac{1}{10}$.
Tinct. aurantii, ...	♏x.
Mist. chloroformi, ...	fʒss.
Aquæ, ...	q. s. ad fʒj.

M. pro dosi.

When coca is used as a tonic in cases of debility, slow convalescence after fever, weak digestion, etc., it is usually in the form of an elixir or wine, the alcohol in these cases being synergistic, and possibly in many instances the more active agent in the combination. In these conditions the dangers of the formation of an alcohol habit must be borne in mind, and a change made to the solid extract or an infusion. The weak heart of typhoid fever is supported by $\frac{1}{4}$-grain doses, every two hours, of cocaine hydrochlorate. It is useful in sexual debility. In various nervous disorders—hiccough, asthma, chorea, paralysis agitans, alcoholic tremors, senile tremor—Bartholow declares that cocaine produces more favorable effects than any other remedy. Dr. J. K. Bauduy, of St. Louis, has found the alkaloid of decided service in melancholia. Murrell, of London, recommends the local use in neuralgia of a 20-per-cent. solution of the hydrochlorate of cocaine dissolved in oil of cloves. Five to 10 minims of this solution are rubbed in with the finger over the seat of pain. The pain of gouty joints may also be diminished by local application of this remedy. Waugh has used coca largely in the treatment of alcoholism. For acute cases he employs the following :—

℞ Tinct. capsici, ...	f℥j.
Vini cocæ, ...	f℥vij.

M. Sig.: A tablespoonful every two to four hours.

To assist in overcoming the habit of alcohol-drinking, he gives coca-leaves in the form of a masticatory, which can be easily carried and taken without attracting notice. He believes that the source of the longing for drink is often to be found in the mouth, and that coca when chewed exerts a local anæsthetic effect, as well as a general systemic action. The wine of coca is useful in giving tone to the vocal cords and preventing hoarseness in professional speakers or singers.

Finally, cocaine, or the fluid extract of erythroxylon, is an efficient antidote to narcotic poisoning by opiates or chloral, and may be used hypodermatically.

ESCHSCHOLTZIA.—Eschscholtzia.

Dose, gr. xxx.

Pharmacology.—The Eschscholtzia Californica (Papaveraceæ) enjoys a reputation upon the Pacific coast of this country as a soporific and analgesic, and is known as the California poppy. It is represented by a number of varieties, and it is necessary to obtain the genuine species, as some appear to be inert. It is claimed that it possesses a small amount of **Morphine,** although other principles not yet isolated contribute toward producing its effects, among which is **Sanguinarine.**

Physiological Action.—The effects upon animals are gradual slowing of respiration after a brief preliminary increase of rapidity; death is due to failure of respiration. The effect upon the nervous system is that of a narcotic. The motor nerves are affected before the sensory. The cumulative effects in human subjects resemble those produced by codeine. Though its narcotic effects are not very decided, yet they continue for a considerable period after its discontinuance.

Therapy.—It is claimed that the eschscholtzia is an efficient though harmless soporific agent, especially for children. It relieves pain and induces sleep, relieves tremor, and agrees well with the digestive organs. Eschscholtzia, in the form of the fluid extract or the syrup (fʒss–v at a dose), is a good addition to cough mixtures where the use of opium is not considered advisable.

EUCALYPTUS (U. S. P.).—**Eucalyptus, Australian Blue-Gum Tree.**

Preparations.

Oleum Eucalypti (U. S. P.).—Oil of Eucalyptus. *Dose,* ♏iii–xx.

Extractum Eucalypti Fluidum (U. S. P.).—Fluid Extract of Eucalyptus. *Dose,* ♏v–fʒj.

Tinctura Eucalypti.—Tincture of Eucalyptus (f℥ii–Oj). *Dose,* fʒi–iv.

Aqua Eucalypti.—Water of Eucalyptus. *Dose,* fʒii–iv.

Pharmacology.—The blue gum of Australia is a tall tree that has been of considerable interest to sanitarians, since it is easily cultivated in marshy grounds, and is said to render malarious districts healthy, such as the Campagna, where they have been recently planted. This is partly on account of the volatile oil and resins of the tree, and partly because it drains the soil of water, the exhalation of water from the leaves being said to be equal in amount each day, on an average, to the weight of the tree. The leaves are the officinal portion of the plant, Eucalyptus globulus (Myrtaceæ). They should be collected from rather old trees, as those from young trees are smaller and less aromatic. They have a camphor-like odor and a pungent, bitter taste; contain a volatile oil, a crystallizable resin, and some tannin. The volatile oil, by frac-

tional distillation, is separated into three oils of different density, the lightest and most important being **Eucalyptol,** the others being **Terpene** and **Cymol.** The fluid extract, being made by percolation with alcohol, is a strong tincture. A medicated water, made like the officinal waters, is useful as a vehicle for alkaloids for hypodermatic use, as it prevents fermentation and deterioration; it is also a vehicle for medicated sprays. Alkalies, mineral acids, and metallic salts (iron, mercury, lead, zinc) are chemically incompatible with preparations of this drug; while tonics, simple and aromatic bitters, essential oils, turpentine, camphor, cubeb, etc., are synergistic, and increase its physiological and therapeutic effects.

Physiological Action.—Eucalyptus is obnoxious to lower forms of life and is a good disinfectant. Applied to the skin, the oil is an irritant, increasing the local blood-supply and partly diffusing into the blood, where it produces systemic effects. The vapor of eucalyptus, inhaled in quantity, also produces systemic effects, besides its local action upon the bronchial mucous membrane. In the mouth it is pungent, aromatic, camphor-like, or resembling cubeb in its impressions upon the nerves of taste. Eucalyptus excites the flow of saliva and leaves a disagreeable, hot, astringent flavor. In the stomach a sensation of warmth is felt, and it acts as a carminative and antiseptic; the appetite and digestion improve, and the secretion of the gastric juice and of the intestinal fluids is increased. It favors the evacuation of the bowels, and the alvine evacuations are somewhat more copious. This drug is a diaphoretic and diuretic, the eucalyptol being eliminated largely by the kidneys, but also through the skin and bronchial mucous membrane. The excretion of urea is augmented; the action of the heart is increased; the arterial tension is at first increased, then lowered. The respiratory movements are accelerated. Eucalyptus inhibits the amœboid movements of the white blood-cells. Very large doses cause gastric distress, indigestion, diarrhœa, with congestion of the kidneys, the characteristic odor of eucalyptus being recognized in the urine, breath, and discharges from the bowels. The action of the heart and lungs is decreased and the temperature falls. Wakefulness is one of the physiological results, but it may indirectly favor sleep in debilitated conditions of the system. Paralysis of the respiration causes death in the lower animals to which a lethal dose has been given. Its action may be summed up as antiseptic, carminative, digestive, tonic, laxative, diaphoretic, expectorant, and diuretic.

Therapy.—Eucalyptus is used as an antiseptic in the treatment of wounds and ulcers, acting as a substitute for carbolic acid. An ointment of eucalyptus is officinal in the British Pharmacopœia. It is made by

incorporating 1 ounce, by weight, of the oil of eucalyptus with 2 ounces each of soft and hard paraffin, and is a good dressing to chronic, indolent, or unhealthy ulcers. The tincture, or the water, of eucalyptus may be used externally for the same purpose. A combination of eucalyptus and iodoform is a serviceable application to chancres and chancroids. The oil is a very useful addendum to preparations for the relief of chronic eczema, in which the following combination is often found beneficial:—

℞ Hydrarg. ammoniat.,	gr. xv.
Olei eucalypti,	♏viij.
Beta-naphthol.,	gr. x.
Pulv. marantæ,	ʒij.
Unguent. zinci oxidi,	℥j.—M.

The vapor may be used by dropping the oil upon hot water, or upon cotton-wool placed in an inhaler; or the steam-atomizer may be employed with eucalyptol-water for inhalation in phthisis, dilated bronchial tubes, bronchial catarrh with fetid expectoration, etc. Applied directly to the diseased membrane, or inhaled in a vaporized state, the oil is a good antiseptic in diphtheria. One part of the oil to 50 of plain or medicated water may be advantageously used as an injection in gonorrhœa. It may likewise be employed as a mild counter-irritant in bronchial and arthritic inflammations. In alopecia, when the scalp is covered and the glands occluded by a thickened and vitiated sebum, the oil of eucalyptus is of very material service. Its local stimulant effects sometimes prove valuable in anidrosis. A soap (sapo eucalyptoli) containing 5 per cent. of the oil is of utility in the treatment of foul wounds, or ulcers, and bromidrosis. In phthisis, J. Roussel recommends hypodermatic injections of 1 part of the oil of eucalyptus in 4 parts of pure olive-oil. In asthma, cigarettes may be smoked, containing leaves of eucalyptus, with belladonna or coca, and stramonium-leaves, associated with tobacco, if desired, and much advantage derived from it, especially if the fumes be inhaled. The fluid extract is an efficient stomachic in indigestion due to deficient secretion or to gastric or intestinal catarrh; by its use the intestinal tract becomes more healthy in character, and no longer affords a place of development for intestinal parasites. Eucalyptus is an efficient remedy in the vomiting caused by sarcinæ. In the ordinary oxyurides, or seat-worms, injections of a decoction of eucalyptus-leaves are useful, and this preparation may also be employed as a gargle for sore throat and stomatitis, scurvy, etc. The stimulating effect upon the circulation of the volatile oil is well shown in cases of palpitation, irregularity, sudden flushes, and flatulence. As the drug is antiseptic, and escapes by the bronchial mucous membrane to a considerable degree, it is serviceable in chronic bronchitis, in the

declining stage of pneumonia, in incipient phthisis, gangrene of the lungs, and diphtheria. Where there is an anæmic state of the nerve-centres manifested by chorea, neurasthenia, hysteria, and asthma, benefit is derived from eucalyptol given in capsules, emulsion, or simply dropped upon sugar (♏ii–v at a dose). In rheumatic or malarial headache it sometimes proves efficacious.

Eucalyptus is believed to be especially serviceable in catarrhal affections of the genito-urinary organs, desquamative nephritis, pyelonephritis, chronic catarrh of the bladder, with putrid urine, and in gleet. It likewise effects improvement in vaginitis. In fevers, especially malarial fevers, it is useful; but it is inferior to quinine in controlling the paroxysms, being most employed in chronic malarial poisoning and in convalescence from acute attacks, when it may be used in alternation with cinchona. This remedy causes reduction of the enlarged spleen, or "ague-cake," due to malarial toxæmia.

Dr. Benjamin Bell recommends the tincture of eucalyptus to be given in drachm doses every third or fourth hour in typhoid fever, and believes that it exerts a favorable influence upon the diarrhœa. In scarlatina it is a good practice to add 5 drops of the oil of eucalyptus to the ounce of prepared lard, for use as an unguent.

EUONYMUS (U. S. P.).—Euonymus, Wahoo.

Preparation.

Extractum Euonymi (U. S. P.).—Extract of Euonymus. *Dose*, gr. i–v.

Pharmacology.—The bark of Euonymus atropurpureus (Celastraceæ) contains a bitter, amorphous substance; also, resins, euonic acid, and asparagin. The impure resin, with the bitter principle, is known commercially as **Euonymin** (dose, gr. ss–v).

Physiological Action.—Euonymus is in small doses a tonic, increasing appetite and gastric secretions; in larger doses it is an irritant and cathartic. Euonymus is also an expectorant and diuretic, and exerts considerable influence upon the liver, as a cholagogue, resembling rhubarb in its action. The excretion of uric acid is at first increased, but subsequently diminished, by the use of euonymus.

Therapy.—It has been employed as a cholagogue purgative, especially in conjunction with antiperiodic treatment, in malarial poisoning. In torpid liver and chronic constipation, it aids the action of other remedies. Intestinal indigestion and jaundice are benefited by the administration of this agent. As a diuretic, it has also been employed in cases of dropsy. Euonymin is a convenient form in which to prescribe it, although the solid extract is practically the same.

EUPATORIUM (U. S. P.).—**Eupatorium, Thoroughwort, Boneset. Dose,** gr. xv–ʒj.

Preparations.

Extractum Eupatorii Fluidum (U. S. P.).—Fluid Extract of Eupatorium. *Dose,* ♏xxx–fʒj.

Infusum Eupatorii.—Infusion of Eupatorium, Boneset-Tea. *Dose,* f℥ii–iv, or more.

Pharmacology.—The leaves and flowering tops of Eupatorium perfoliatum (Compositæ), an indigenous plant, enjoy considerable reputation in recent infusion (boneset-tea) for acute colds, rheumatism, and dysmenorrhœa. They contain **Eupatorin,** a neutral, bitter principle, with volatile oil and tannic acid.

Therapy.—The hot infusion (℥i–Oj) is a diaphoretic and (in large doses) emetic, acting like chamomile-flowers. The powdered dried herb is a domestic remedy for dyspepsia, but is best given in fluid extract.

The **Eupatorium purpureum,** gravel-root or trumpet-weed, an allied species, contains in its root an acrid resin and an oil, and is a stimulating diuretic. It is best given as a fluid extract of the root in dose of ♏xxx–fʒij.

EUPHORBIA PILULIFERA.—Pill-bearing Spurge, Snake-Weed.

Preparations.

Decoctum Euphorbiæ Piluliferæ.—Decoction of Euphorbia Pilulifera. *Dose,* f℥ij.
Extractum Euphorbiæ Piluliferæ.—Extract of Euphorbia Pilulifera. *Dose,* gr. i–ij.
Tinctura Euphorbiæ Piluliferæ.—Tincture of Euphorbia Pilulifera. *Dose,* ♏x–xxx.
Extractum Euphorbiæ Piluliferæ Fluidum.—Fluid Extract of Euphorbia Pilulifera. *Dose,* ♏xxx–fʒj.

Pharmacology.—Euphorbia pilulifera (Euphorbiaceæ), pill-bearing spurge, is a native of most tropical countries. The variety which has been introduced into medical practice comes from Queensland, Australia. It is an annual herbaceous plant, growing to the height of one or two feet. The fresh root is red; the dry is reddish brown. The stalk is more or less procumbent and covered with yellowish hairs. The leaves are of a deep-green color. The fruit incloses three seeds, which bear some resemblance to a coffee-grain. The plant yields its virtues to water. The aqueous solution seems to contain tannin, but no alkaloid.

Physiological Action.—A strong solution of this drug has no irritant effect upon the skin. The taste is slightly astringent. It causes no redness or smarting of the tongue or buccal cavity, but is irritant to the gastric mucous membrane, and may occasion nausea or epigastric pain. No effect has been observed upon the spinal cord or muscular system. It produces no change in the calibre of the capillary vessels. The secretions are unaffected. Small doses are fatal to frogs and guinea-pigs,

first accelerating and then retarding the respiration and circulation, probably acting directly upon their respective centres. It is thought to be eliminated by the liver, and is devoid of cumulative effects.

Therapy.—Euphorbia pilulifera is chiefly of value as a remedy in spasmodic asthma, though it is not without merit in other thoracic diseases. Dr. Marsset, to whom we owe our knowledge of its physiological action, employed it in a number of cases in private practice, and reports others from the service of Dujardin-Beaumetz. It was found of signal benefit in paroxysmal asthma, whether uncomplicated or connected with chronic bronchitis and emphysema. The effect was favorable and prompt, irrespective of the origin of the disorder. Dr. Tison has found the remedy beneficial in the dyspnœa of cardiac disease. In Australia the plant is highly esteemed for its power of allaying the asthmatic paroxysm. It has likewise been found of service in chronic bronchitis, especially when occuring in old people. Dr. Marshall has prescribed it with advantage in phthisis, in which it checked the cough, promoted expectoration, and exerted some anodyne influence. The decoction is slightly tonic. The leaves have also been smoked in a pipe with satisfactory results in cases of asthma. In asthma complicated with emphysema it may very serviceably be combined with quebracho:—

℞ Tinct. euphorbiæ pilulif., ... f℈ij.
Ext. quebracho fl., ... q. s. ad f℥ij.

M. Sig.: A half to two teaspoonfuls in water, every three or four hours, for asthma, chronic bronchitis, and emphysema.

EUPHORBIUM.—Euphorbium.

Pharmacology.—The Euphorbia resinifera (Euphorbiaceæ) is a native of Morocco, the officinal portion being a gum-resin, which flows from incisions in the stem and hardens in the air. The substance is yellowish, opaque, or slightly translucent, and brittle; without odor, but the powder causes much irritation and sneezing; taste acrid and burning. It is insoluble in water, only partly soluble in alcohol. It consists of an acrid resin (38 per cent.), euphorbon (22 per cent.), gum (18 per cent.), malates (12 per cent.), etc.

Physiological Action.—It is irritating to the skin and vesicant, owing to the acrid resin. **Euphorbon** is a drastic purgative and emetic.

Therapy.—It is only employed for external purposes as a rubefacient and counter-irritant. When combined with cantharides, it forms a good vesicating plaster (Janin's plaster).

The **Euphorbia corollata,** or large flowering spurge, is emetic, diaphoretic, and expectorant. The root is used (gr. xv–xx), of which a decoction may be made.

The **Euphorbia ipecacuanha,** or ipecacuanha spurge, grows along the

Atlantic coast of the United States, and possesses considerable medicinal virtues. The root is the part used; it contains euphorbon, acrid resin, and possibly some glucoside. As an infusion or fluid-extract, it is used as an emetic, diaphoretic, or expectorant, according to the dosage; large quantities act as a hydragogue cathartic. It has been employed in domestic practice for menstrual irregularity, dropsy, bilious colic, and catarrhal affections of the air-passages.

EUPHRASIA.—Euphrasia, Eyebright.

Pharmacology.—The Euphrasia officinalis (Scrophulariaceæ), a small herb of the White Mountains and Lake Superior region and also of Europe, with opposite leaves and spikes of blue flowers. In spite of its title, it is not officinal in the United States Pharmacopœia. It is astringent, containing tannin, euphrastic acid, etc. A tincture (10 per cent.) is useful in incipient catarrhal affections, hay fever (dose, ♏x every two hours), and measles.

EXALGINE.—Orthomethyl-Acetanilid.

Dose, gr. i–vj, or from 6 to 12 grains in the course of the day.

Pharmacology.—This is a recent introduction into medicine from the chemical laboratory. It is a new derivative of the aromatic series, with the formula, $C_9H_{11}NO$ (or C_6H_5, O_2H_3O, NCH_3), and is one of the three methyl derivatives of acetanilid. It is in fine, acicular, or long, tablet-like crystals, the first being obtained by evaporation from solution, the latter from fusion. Sparingly soluble in cold water, more so in hot water, and extremely soluble in dilute alcohol.

Physiological Action.—Exalgine has been brought forward by Brigonnet, of the Cochin Hospital, and has been extensively employed as an analgesic; its effects being principally manifested upon the sensory nerves. Exalgine, which is also an antiseptic, is eliminated by the urine, the amount of which it diminishes. It reduces abnormal temperature like other members of the group, and is claimed to be equally efficient in about half the dose of antipyrin. It is not followed by a rash upon the skin or other disagreeable effects. As it is soluble in dilute alcohol, it may be given in water flavored with elixir of orange or rum. The smallness of the dose gives it a decided advantage over some other preparations of this group.

Therapy.—In all forms of neuralgia, especially the visceral forms, exalgine has been shown to have marked control over pain. It is said to decrease the quantity of sugar excreted in diabetes mellitus. In diabetes, from 6 to 12 grains daily may be given. In facial neuralgia and myalgia, especially in anæmic, neurotic patients, good results are obtained from doses of 1 grain every four hours.

FABIANA IMBRICATA.—Pichi.

Preparation.

Extractum Fabianæ Fluidum.—Fluid Extract of Fabiana. *Dose,* ♏xv–xl.

Pharmacology.—Fabiana imbricata (Solanaceæ), or Pichi, a South American plant, is a shrub, or small tree, which grows upon high, dry hill-tops. Its branchlets are arranged in the form of plume-like sprays, which have a peculiar, light bluish-green color, due to the large amount of bluish or greenish-gray resin, with which all its tender parts are covered. Besides this resin the drug contains tannin, starch, a minute quantity of some alkaloid, probably peculiar to itself, and an abundant proportion of a glucoside analogous to esculin. The preparations are made from the leaves.

Therapy.—A tincture of pichi has a disagreeable, persistent, bitter taste, and, unless combined with an alkali, its resin is precipitated upon the addition of water. Pichi exerts a stimulant effect upon the kidneys, but its physiological action has not been closely studied. Its therapeutical influence is chiefly manifested in affections of the genito-urinary apparatus. In enuresis nocturna, pichi has often a most beneficial action. The following combination will be found of service:—

℞ Extract. fabianæ fluid., ... f℥j.
Tinct. belladonnæ, ... ♏xij.
Aquæ cinnamomi, ... f℥iij.
M. Sig.: A teaspoonful morning and night.

Pichi has been given with success in jaundice and dyspepsia dependent upon an insufficient secretion of bile. The essential oil of pichi acts as a stimulant to secreting organs generally, and modifies or cures chronic purulent discharges from mucous membranes. Pichi is a valuable remedy in the treatment of lithiasis, or calculus of the kidney or bladder. Especially when given in combination with an alkali, it holds uric acid in solution, and it is thought that its resin dissolves the mucus which binds together the particles of a stone, leading to disintegration and facilitating expulsion. In chronic renal congestion and calculous pyelitis this drug is of service, but is believed to be contra-indicated when degeneration of renal tissue exists. Acute or chronic cystitis is benefited by the administration of pichi. Dr. Hal. C. Wyman reports very favorably upon this remedy in cystitis dependent on stricture or manipulative procedures within the urethra, and likewise in cases of lumbago and sciatica associated with the deposition of uric acid. Dr. Wyman commends the following formula:—

℞ Extract. fabianæ fluid., ... f℥j.
Potassii nitratis, ... ʒj.
Elixir. simplicis, ... f℥iij.
M. et ft. sol.
Sig.: A teaspoonful once in two hours.

FEL BOVIS (U. S. P.).—**Ox-Gall.**

Preparations.

Fel Bovis Inspissatum (U. S. P.).—Thickened Ox-Gall (strained and evaporated to one-half in a water-bath). *Dose*, in pill, gr. v–viij.

Fel Bovis Purificatum (U. S. P.).—Purified Ox-Gall (pilular consistence). *Dose*, in pill, gr. iii–vj.

Pharmacology.—Fresh ox-gall (from Bos taurus; class, Mammalia; order, Ruminantia) is a greenish-brown, viscid liquid, with a peculiar, nauseating odor and bitter, offensive taste. Its solution froths when shaken and saponifies fats. Its reaction is alkaline; specific gravity, 1018 to 1028.

Physiological Action and Therapy.—Ox-gall is antiseptic and laxative, assisting in the absorption and digestion of fats in the intestinal tract and stimulating peristalsis. The local application of bile causes absorption of hypertrophies, and enlarged tonsils. It may be used internally to assist the digestion and assimilation of fatty foods or of codliver-oil, and may be given in habitual constipation with deficient assimilation.

In jaundice, Harley recommends ox-gall, given in 5-grain doses, in capsules, in order that it may reach the duodenum before being acted on by the stomach. It is also of benefit, in combination with other drugs, in hepatic and intestinal affections. The following prescriptions containing ox-gall are recommended:—

℞ Fel bovis purificati,
Magnesii carbonatis, ... āā c.
Ol. menth. pip., ... ♏j.
M. et ft. capsulæ no. xx.
Sig.: A capsule three or four times a day, after meals, in dyspepsia and constipation.

℞ Fel bovis purificati, ... ʒj.
Extracti nucis vomicæ, ... gr. j.
Aloini, ... gr. j.
Ol. cinnamomi, ... ♏j.
M. et ft. pil. no. xx.
Sig.: Two pills between meals. Serviceable in torpor of the liver and in dyspepsia.

Pancrobilin is a combination of purified ox-bile and a preparation of fresh pancreas. It is best given in pills (3 grs.) after meals. Useful in duodenal dyspepsia, constipation, insufficient digestion, or assimilation of fats. A liquid pancrobilin (dose, f℥i–ij) is also furnished by Messrs. Reed & Carnrick, New York.

FERMENTUM.—Yeast.

Pharmacology.—Yeast is a pale-brown, viscid, frothy liquid, with a bitter taste. Used externally in a poultice for boils and suppurating wounds or foul ulcers, and internally as an alterative tonic in furuncles and typhoid fever. It is said to cause disappearance of sugar from the urine in diabetes.

Dose, f℥ss–j before meals.

FERRUM (U. S. P.).—Iron.

Preparations.

Ferrum Reductum (U. S. P.).—Reduced Iron. *Dose*, gr. i–v.

Ferri Carbonas Saccharatus (U. S. P.).—Saccharated Carbonate of Iron (at least 15 per cent. of ferrous carbonate). *Dose*, gr. ii–x.

Massa Ferri Carbonatis (U. S. P.).—Mass of Carbonate of Iron. Vallet's Mass (iron sulphate 100, sodium carbonate 110, honey 38, sugar 25, syrup and water q. s. ad 100 parts) has 42 per cent. ferrous carbonate. *Dose*, gr. iii–v.

Mistura Ferri Composita (U. S. P.).—Compound Mixture of Iron. Griffith's Antihectic Mixture (iron sulphate 6, myrrh 18, sugar 18, potassium carbonate 8, compound tincture of lavender 50, rose-water 900 parts). *Dose*, f℥ii–f℥ss.

Pilulæ Ferri Compositæ (U. S. P.).—Compound Iron Pills (iron sulphate gr. $\frac{3}{4}$, sodium carbonate gr. $\frac{3}{4}$, myrrh gr. iss, in each pill). *Dose*, 2 to 4.

Ferri Iodidum Saccharatum (U. S. P.).—Saccharated Iodide of Iron. *Dose*, gr. v–xx.

Pilulæ Ferri Iodidi (U. S. P.).—Pills of Iodide of Iron* (each gr. j ferrous iodide, coated with tolu). *Dose*, 2 to 4 pills.

Syrupus Ferri Iodidi (U. S. P.).—Syrup of Iodide of Iron (10 per cent. ferrous iodide). *Dose*, ♏v–xxx.

Ferri Chloridum (U. S. P.).—Chloride of Iron (or perchloride). Used as a hæmostatic.

Liquor Ferri Chloridi (U. S. P.).—Solution of Chloride of Iron (37.8 of ferric chloride). Principally used in making the tincture. *Dose*, ♏ii–x.

Tinctura Ferri Chloridi (U. S. P.).—Tincture of Chloride of Iron (solution of ferric chloride 35, alcohol 65 parts). *Dose*, ♏v–f℈j.

Ferri Citras (U. S. P.).—Citrate of Iron. *Dose*, gr. v–xx.

Liquor Ferri Citratis (U. S. P.).—Solution of Citrate of Iron (35.5 per cent. of anhydrous citrate of iron). *Dose*, ♏x–xl.

Vinum Ferri Citratis (U. S. P.).—Wine of Citrate of Iron (contains citrate of iron and ammonium, 4 parts; tincture sweet-orange peel and syrup, each 12, stronger white wine 72 parts). *Dose*, f℈i–iv.

Ferri et Ammonii Citras (U. S. P.).—Citrate of Iron and Ammonium (ammonio-ferric citrate). *Dose*, gr. iii–v.

Ferri et Quininæ Citras (U. S. P.).—Citrate of Iron and Quinine (citrate of iron 88, quinine 12 parts). *Dose*, gr. iii–v.

Liquor Ferri et Quininæ Citratis (U. S. P.).—Solution of Citrate of Iron and Quinine (citrate of iron and ammonium 65, quinine 12, acid citric 28, alcohol 30, distilled water q. s. ad 100 parts). *Dose*, ♏v–xv.

Vinum Ferri Amarum (U. S. P.).—Bitter Wine of Iron (8 per cent. of above solution). *Dose*, f℈i–f℥j.

Ferri et Strychninæ Citras (U. S. P.).—Citrate of Iron and Strychnine (98 per cent. citrate of iron and ammonium, 1 per cent. each of strychnine and citric acid). *Dose*, gr. i–iij.

Syrupus Ferri, Quininæ, et Strychninæ Phosphatum (U. S. P.).—Syrup of the Phosphates of Iron, Quinine, and Strychnine (phosphate of iron 133, quinine 133, strychnine 4, phosphoric acid 800, sugar 6000 parts, and water sufficient quantity to make 10,000 parts) contains $\frac{1}{25}$ per cent. of strychnine, or gr. $\frac{1}{20}$, to each ounce. *Dose*, f℈i–iv.

Ferri Lactas (U. S. P.).—Lactate of Iron. *Dose*, gr. ii–x.

Syrupus Hypophosphitum cum Ferro (U. S. P.).—Syrup of the Hypophosphites with Iron (lactate of iron, 1 per cent.). *Dose*, f℈i–iv.

*Blancard's Unchangeable Iodide of Iron Pills are especially protected by a coating of reduced iron; but they are less soluble in the gastric juice.

Ferri Oxalas (U. S. P.).—Oxalate of Iron. *Dose*, gr. ii–v.

Ferri Oxidum Hydratum (U. S. P.).—Hydrated Oxide (sesquioxide) of Iron (freshly precipitated by the addition of an excess of ammonia to the solution of the tersulphate of iron and washed and strained. For use as an antidote to arsenious-acid poisoning, 20 grains to be taken for each grain of arsenic swallowed, a tablespoonful the ordinary dose as an antidote).

Ferri Oxidum Hydratum cum Magnesia (U. S. P.).—Hydrated Oxide of Iron with Magnesia. When required for use, is obtained by mixing (1) solution of tersulphate of iron 1000 grains, water 2000 grains, with (2) magnesia 120 grains, in water 32 fluidounces. The precipitate is collected as before. "The dilute solution of tersulphate of iron and the mixture of magnesia with water should always be kept on hand for immediate use." To be used like the preceding in arsenical poisoning.

Liquor Ferri Acetatis (U. S. P.).—Solution of the Acetate of Iron (33 per cent. anhydrous salt). Used in the next preparation.

Tinctura Ferri Acetatis (U. S. P.).—Tincture of the Acetate of Iron (16½ per cent. anhydrous salt). *Dose*, ♏x–f℥j.

Ferri et Ammonii Sulphas (U. S. P.).—Sulphate of Iron and Ammonium (ammonio-ferric alum). *Dose*, gr. iii–v.

Ferri et Ammonii Tartras (U. S. P.).—Tartrate of Iron and Ammonium. Ammonio-Ferric Tartrate (about 25 per cent. ferric oxide). *Dose*, gr. v–xx.

Ferri et Potassii Tartras (U. S. P.).—Tartrate of Iron and Potassium. Potassio-Ferric Tartrate. *Dose*, gr. v–xv.

Ferri Phosphas (U. S. P.).—Phosphate of Iron. *Dose*, gr. v–x.

Ferri Pyrophosphas (U. S. P.)—Pyrophosphate of Iron. *Dose*, gr. ii–v.

Ferri Hypophosphis (U. S. P.).—Hypophosphite of Iron. *Dose*, gr. v–x.

Ferri Valerianas (U. S. P.).—Valerianate of Iron. *Dose*, gr. i–iij.

Ferri Sulphas (U. S. P.).—Sulphate of Iron. *Dose*, gr. i–v.

Ferri Sulphas Exsiccatus (U. S. P.).—Dried Sulphate of Iron. *Dose*, gr. i–ij.

Ferri Sulphas Præcipitatus (U. S. P.).—Precipitated Sulphate of Iron. *Dose*, gr. i–ij.

Liquor Ferri Subsulphatis (U. S. P.).—Solution of the Subsulphate of Iron (Monsel's Solution). *Dose*, ♏ii–x.

Liquor Ferri Tersulphatis (U. S. P.).—Solution of Tersulphate of Iron (for making hydrated oxide of iron).

Mistura Ferri et Ammonii Acetatis (U. S. P.).—Mixture (solution) of Acetate of Iron and Ammonium (Basham's Mixture). *Dose*, f℥i–iv.

Pilulæ Aloës et Ferri (U. S. P.).—Pills of Aloes and Iron (purified aloes and dried sulphate of iron, 1 gr. each. *Dose*, 1 to 3 pills.

Emplastrum Ferri (U. S. P.).—Iron Plaster (ferric oxide, 10 per cent.).

Trochisci Ferri (U. S. P.).—Troches of Iron (each ferric oxide, gr. v). *Dose*, 1 to 2 troches.

Liquor Ferri Nitratis (U. S. P.).—Solution of Nitrate of Iron (6 per cent.). *Dose*, ♏x–xx.

Syrupus Ferri Bromidi (U. S. P.).—Syrup of Bromide of Iron (10 per cent. ferrous bromide). *Dose*, ♏v–f℥j.

Ferri Albuminas.—Albuminate of Iron. *Dose*, gr. v–xxx.

Ferri Arsenias.—Arseniate of Iron. *Dose*, gr. $\frac{1}{20}$–$\frac{1}{10}$.

Ferri Ferrocyanidum.—Ferrocyanide of Iron (Prussian Blue). *Dose*, gr. iii–vj.

Ferri Malatis Liquor.—Solution of Malate of Iron. *Dose*, f℥ss–ij.

Ferrum Dialysatum.—Dialyzed Iron (a 10-per-cent. solution of ferric oxychloride in water. If properly made, is an easily assimilated chalybeate, free from astringency. Useful in arsenical poisoning. Does not keep well). *Dose*, ♏x–xxx.

Mistura Ferro-Salina.—Ferro-Saline Mixture (sulphate of magnesia, ℥j; cream of tartar, ʒj; dried sulphate of iron, gr. x; water, Oij). *Dose*, a wineglassful before breakfast each morning.

Pharmacology.—Iron is a metallic element, the most abundant, the most widely distributed and most useful to mankind of all the metals. In its pure state it is malleable and ductile, and the pharmacopœia directs its use, therefore, in the pure form of "fine, bright, non-elastic wire," out of which preparations should be made. Ferric salts in solution or in crystals are generally red, and the ferrous salts green; they are likely to be decolorized by drying and become white. The iron compounds are also known as chalybeates, or martial preparations; a large number are used in medicine, besides those found as constituents in natural water, iron being of common occurrence in mineral springs. The chemical tests—vegetable astringents containing tannic or gallic acid, alkalies and their carbonates, acidulous salts and mucilage of acacia—are incompatible with iron preparations.

Physiological Action.—As one of the proximate principles of the human organism, and playing an important part in the red blood-corpuscle (as hæmoglobin) in the nutrition of the body, iron is a necessary element in the food. When applied to the tissues, most of the salts of iron exercise an astringent effect, producing coagulation of albumin. Some of the preparations, notably the solution of the subsulphate and the chloride, are very useful in coagulating blood and checking hæmorrhage, when locally applied. A similar astringent effect is observed in the mouth and along the alimentary canal. One of the objections to the use of most of the iron salts in medicine is the fact that they cause constipation and headache. The phosphate and pyrophosphate are exceptions to this, being non-constipating. Only a small proportion of the iron administered is assimilated, the larger proportion being discharged with the fæces, to which a black color, due to the formation of the sulphide, is imparted. The portion absorbed is largely thrown out again in the bile. Iron augments the amount of urea and increases the frequency of micturition, the tincture of the chloride especially being credited with diuretic properties. It has a tonic influence upon the nerve-centres, but improves nutrition principally by its effect upon the circulation. While iron has little power of increasing the number of blood-corpuscles in health, this power is shown very decidedly in conditions of anæmia or hydræmia; the number of globules being rapidly increased, and the hæmoglobin of the blood gradually brought up to the healthy standard. It is supposed that the iron present in the blood-corpuscles has the property of converting oxygen into ozone, and that it thus promotes oxidation. The heart is also toned up by the effects of the iron preparations, probably owing largely to the stimulus of a better blood-supply to its walls. The stomach is stimulated by the astringent action of the iron, and the appetite and digestive capacity are improved under small doses not too

long continued. Iron slightly raises the temperature of the body partly by increasing tissue waste, partly by its ozonizing effects. Some of the stronger preparations, sulphates, nitrate, iodide and chloride, are irritant, and, in large doses, poisonous.

Therapy.—The styptic qualities of iron are best shown by Monsel's solution and the choride, in powder or solution, when applied directly to the oozing surface, as in surgical operations, post-partum hæmorrhage, hæmorrhage from the uterus after miscarriage, or cancer of that organ.

The resulting clot is very tough and dark-colored, and makes a dirty, disagreeable mass, so that, in ordinary surgical practice, iron is rarely used as a hæmostatic, when a substitute can be found. In some forms of uterine hæmorrhage, Monsel's solution may be used, diluted (1 to 3) or applied in full strength, upon a small swab to the inner surface of the uterus, if the os is previously dilated; or the vagina may be packed with absorbent cotton wet with a 5-per-cent. solution.

In epistaxis, or hæmoptysis, a spray of 1- or 2-per-cent. strength of Monsel's solution may be inhaled. Excessive hæmorrhage from leech-bites or after the extraction of teeth may be controlled by the direct application of the same agent. A solution of the subsulphate may be successfully used to restrain bleeding from hæmorrhoids. The same preparation is effective in destroying syphilitic vegetations. Fissured nipples may be cured by painting them with a mixture of 1 part Monsel's solution and 3 or 4 of glycerin. A spray of the subsulphate is beneficial in chronic ozæna. In erysipelas, the tincture of iron is an excellent local application. The astringent preparations of iron may be used with good effect as injections in gonorrhœa and gleet. Half a drachm of the tincture to ½ pint of water, with a drachm of laudanum or 12 grains of the sulphate to the same quantity of water and laudanum, are forms in which iron may be used for this purpose. These solutions of iron, however, are open to the objection that they stain the patient's clothing. A liquid containing an astringent salt of iron is also a serviceable wash in leucorrhœa. In tonsillitis, pharyngitis, and diphtheria, the same agent may be applied directly to the throat, either pure or diluted with an equal quantity of glycerin; this application is sometimes painful, but is very efficient. The tincture of the chloride of iron, though less astringent than Monsel's solution may be used locally in the same way. In diphtheria, it can be administered internally in this form, and if, as is usually done, the preparation is suitably diluted with water, and then taken through a glass tube (so as to prevent the iron from staining and corroding the teeth), the solution will come directly in contact with the pharynx as it is swallowed, and thus combine the local and systemic effects. In such cases it is sometimes prescribed in combination, as follows:—

℞ Tincturæ ferri chloridi, ...	f℥j.
Potassii chloratis, ...	ʒj.
Syr. aurantii rubri, ...	f℥ij.

M. Sig.: Half a teaspoonful to a teaspoonful every two hours, in diphtheria or erysipelas.

Dr. Garretson's formula for local application in erysipelas contains the tincture of chloride of iron with the tincture of cinchona and the sulphate of quinine (see page 547), and it is applied as an astringent lotion.

These styptic preparations have also been injected into nævi and vascular tumors, to produce coagulation of their contents, but death has resulted from the escape of some of the fluid into the general circulation.

The principal employment of the iron preparations is for their effect upon hæmatosis. They are pre-eminently useful in cases of anæmia, hydræmia, or chlorosis, and in many cases of debility. They should not be used in plethora. As they all to a greater or less degree interfere with the digestive function, checking the secretions along the alimentary tract, and frequently constipate, the state of the stomach should always be considered when prescribing iron. Where the tongue is red and dry, Fothergill has shown that iron always disagrees and should not be ordered. On the other hand, a pale, broad, and flabby tongue, marked by the impression of the teeth, is especially indicative of the demand of the system for iron. There are great differences in this respect, however, between the several preparations of iron, and new chalybeates are being constantly brought forward with the recommendation that they do not derange the digestion nor produce constipation. In amenorrhœa, Blaud's pills of carbonate of iron are of great service, or the compound mixture may be used with excellent effect. Iron is of most value in simple anæmia, such as that following hæmorrhage; it is of less service where the anæmia is symptomatic and accompanies organic diseases, or blood-poisoning. In such cases it acts more quickly when given hypodermatically, the ammonio-citrate dissolved in distilled water being preferred. Chicandard employs the ammonio-ferrous sulphate because it is permanent and soluble. The anæmia which results from chronic malaria is very amenable to the influence of iron. The enlarged spleen of malaria diminishes in size and malarial neuralgia is relieved. Iron is of constant service in the treatment of neuralgia, which so often depends upon a condition of anæmia:—

℞ Mass. ferri carbonatis, ...	gr. xxiv.
Extracti hyoscyami alc., ...	gr. v.
Podophyllotoxin, ...	gr. j.
Quininæ sulphatis, ...	gr. xij.

M. et ft. pil. no. xij.
Sig.: From four to six pills a day, for neuralgia.

℞ Liquor. ferri et quininæ citratis,
Liquor potassii arsenitis, ... āā f℥ij.
Elix. guaranæ, ... q. s. ad f℥iij.

M. Sig.: A teaspoonful three or four times a day. Use in malaria and neuralgia.

Improvement takes place in pseudo-leukæmia, or Hodgkin's disease, when iron is administered, especially in conjunction with arsenic, though the chalybeate preparations are of no utility in true leukæmia:—

℞ Ferri pyrophosphatis, ... gr. xl.
Acidi arseniosi, ... gr. j.
Extracti nucis vomicæ, ... gr. iij.
Extracti belladonnæ alc., ... gr. ij.

M. et ft. pil. no. xx.
Sig.: A pill three times a day.

The tincture of iron is, at times, beneficial in acute rheumatism. It is in the case of weak and pale individuals that iron is likely to be of service. In such subjects the same remedy is capable of acting, to a certain extent, as a prophylactic. It is frequently judicious in syphilis, when accompanied by evidence of profound deterioration of general nutrition, to suspend specific remedies temporarily, and place the patient upon a tonic course containing iron, which may be favorably combined with quinine, strychnine, or hoang-nan. In the so-called gonorrhœal rheumatism, iron will generally be found advantageous. Hecquet for nearly twenty years has used the bromide of iron in nervous affections, and Da Costa found it useful in chorea. Anæmic epileptics are benefited by iron, which may be very appropriately given in the form of the bromide and combined with potassium bromide, as:—

℞ Potassii bromidi, ... ʒvj.
Syrupi ferri bromidi, ... f℥vj.
Tincturæ chiratæ,
Elixir. simplicis, ... āā f℥j.
Aquæ cinnamomi, ... q. s. ad f℥vj.

M. Dose, a tablespoonful three times a day.

The following combinations containing iron may be employed with good effect in gonorrhœa and syphilis:—

℞ Pilulæ ferri iodidi, ... ʒj.
Abstracti ignatiæ,
Extracti belladonnæ alc., ... āā gr. ij.

M. et ft. pil. no. xxx.
Sig.: From four to six pills a day, in gonorrhœal rheumatism and in gleet.

℞ Ferri phosphatis,
Saloli, ... āā gr. cl.
Terebenæ, ... f℥ij.

M. et ft. capsulæ no. xxx.
Sig.: Three to six capsules a day, in gonorrhœa, gonorrhœal rheumatism, and cystitis.

℞ Ferri et potassii tartratis, ... ʒij.
Acidi arseniosi, ... gr. j.
Extracti erythroxyli, ... ʒj.

M. et ft. pil. no. xl.
Sig.: Two pills three times a day, in syphilis.

℞ Liquor. ferri malatis,
Aquæ cinnamomi,
Glycerini, ... āā f℥j.

M. Sig.: One to two teaspoonfuls in water three times a day, for syphilis with irritable stomach.

℞ Ferri lactatis, ... gr. xl.
Extracti cannabis Indicæ, ... gr. iss.
Extracti cascaræ sagradæ, ... gr. iij.

M. et ft. pil. no. xij.
Sig.: A pill three or four times a day, in syphilis.

℞ Syrup. ferri iodidi, ... f℥ij.
Extracti hoang-nan fl., ... ♏l.
Aquæ cinnamomi, ... f℥j.

M. Sig.: A teaspoonful three times a day, for infantile syphilis.

Hysteria, especially when associated with anæmia and amenorrhœa, is improved by the systematic administration of iron. Certain cerebral disorders depend more or less immediately upon anæmia, as some forms of puerperal mania and the insanity of lactation; chronic mania and melancholia, also, are not infrequently due to impoverishment of the blood. In all these cases the tincture of the chloride of iron is a valuable remedy. The continued use of iron is very beneficial in rachitis. In this disease a combination of the phosphate of iron and phosphate of calcium is especially advantageous.

℞ Ferri phosphatis,
Calcii phosphatis, ... āā ʒij.
Extracti nucis vomicæ, ... gr. v.
Ol. eucalypti, ... ♏v.

M. et ft. pil. no. xl.
Sig.: Two pills three times a day.

The styptic preparations of iron, given internally, are useful in hæmorrhage. A drop or two of the nitrate or subsulphate solution, given in ice-water and frequently repeated, will usually check bleeding from the stomach; 5 to 10 drops of the tincture given upon shaved ice every half hour is recommended in the hæmorrhagic vomiting of yellow fever. The tincture of the chloride is an excellent remedy in hæmorrhage from the bowels or kidneys, and in purpura hæmorrhagica. Iron is useful, likewise, in the treatment of menorrhagia. Profuse discharges from mucous membranes, due to chronic inflammation, are restrained by the exhibition of iron, which acts as an astringent and at the same time

favorably modifies the nutrition of the cells. Chronic diarrhœa and dysentery, chronic bronchitis, prostatorrhœa, gleet, and leucorrhœa are ameliorated by a chalybeate course. Dilatation of the stomach, dependent upon or connected with anæmia, is sometimes improved by the administration of iron, and, owing to its beneficial effect upon the mucous membrane, the syrup of iron is useful in the treatment of thread-worms. (A drachm of the tincture to half a pint of water is a good rectal injection when these parasites are present.) By maintaining the quality of the blood and promoting nutrition, iron is of service in phthisis and emphysema. Affections of the heart are notably improved by this remedy. In fatty degeneration, dilatation, and valvular disease, iron is demanded, in order to maintain the quality of the blood and the nutrition of the heart and to promote compensatory growth. The anæmia and indigestion of Bright's disease also receive benefit from this remedy, especially in the form of the tincture of the chloride or acetate. The nocturnal incontinence of urine in children often yields to iron. This is especially true of strumous children, for whom the syrup of the iodide is the best preparation. Iron is remedial in spermatorrhœa when that affection is the result of anæmia and relaxation. Both amenorrhœa and dysmenorrhœa are often due to impoverished blood, and, when this is the case, are best treated by iron. The menstrual irregularity, anæmia, and neurasthenia so often seen in overworked and underfed women in our great cities are conspicuously benefited by the administration of the "four chlorides," as recommended by Professor Goodell. The combination may be made as follows:—

℞ Tinct. ferri chloridi,	f℥iiss.
Hydrarg. chloridi corrosiv.,	gr. ij.
Liquor. arsenici chloridi,	f℥iiss.
Acid. hydrochlorici dilut.,	f℥v.
Syrup. simplicis, q. s. ad	f℥iv.

M. et ft. sol.
Sig.: Teaspoonful in water three times a day.

The vasomotor disturbances incident to the menopause are often relieved by full doses of the tincture of iron, given several times a day. Phagedæna usually occurs in dissipated and debilitated individuals, and iron internally materially assists the action of the appropriate topical applications.

Special Applications.—Among the new preparations are the solutions of ferrous malate and of dialyzed iron, both of which cause very little disturbance and rarely constipate. That the latter does exert astringent effects, however, may be inferred from the fact that Dr. W. Judkins has found it a useful remedy in the diarrhœa of childhood. Lævulose ferride

is another very eligible preparation of iron, differing, in many respects, from the others. It is of alkaline reaction, agreeable to the palate and the stomach, and, it is said, can be mixed with the ordinary fluid extracts and tinctures without causing chemical union between the iron and the tannin and the formation of insoluble tannates. The albuminate of iron is an aromatic, reddish-brown, alkaline solution, which is said to be more readily assimilable than other iron-salts, less frequently the cause of gastric disorder, and is promptly assimilated, causing rapid increase in the globular richness of the blood. It may be given in milk (Dumont). Dr. J. A. Ouchterlony* finds it especially serviceable when anæmia and debility are associated with weak and irritable digestive organs. The reduced iron, or Quevenne's iron, is in such a minute state of subdivision that it is readily acted upon by the acid of the gastric juice, and generally agrees with the stomach. As it is tasteless, it may be given to children in the form of chocolates, each containing 1 grain, and thus forms an excellent tonic for anæmic and poorly-developed children. When used for its systemic effect, small doses are as efficient as large ones; it is best given when digestion is active,—about half an hour after meals.

℞ Ferri reducti, ... gr. xl.
Sodii arseniatis, ... gr. j.
Abstract. ignatiæ, ... gr. v.
Ext. gentianæ, ... gr. xx.
M. et ft. pil. no. xx.
Sig.: Take one three times a day, after meals, as a general tonic for an adult.

It is well to bear in mind that the prolonged administration of iron is liable to cause intestinal concretions.

The diuretic action of the tincture of the chloride is aided by saline combination. Thus, in chronic Bright's disease of the kidneys with œdema, we may give:—

℞ Tinct. ferri chloridi,
Acid. phosphoric. dilut., ... āā f℥ij.
Glycerini, ... f℥j.
Liq. ammonii acetatis, ... q. s. ad f℥vj.
M. Sig.: A tablespoonful three or four times daily in dropsy attending Bright's disease or pregnancy.

Instead of this, we may order the officinal mixture of the acetate of iron and ammonium (Basham's mixture), or the following:—

℞ Tr. cantharidis, ... f℥j.
Tr. ferri chloridi, ... f℥ij.
M. Sig.: Give twenty to thirty drops, well diluted, four times daily, to be taken through a glass tube, in gleet.

The syrup of the iodide of iron is valuable in strumous skin diseases,

* Communication to Louisville Clinical Society, October 22, 1889.

in conjunction with codliver-oil. The same remedy, alone or in conjunction with codliver-oil, is of undoubted efficacy in the treatment of enlarged strumous glands prior to the occurrence of caseous degeneration. In erysipelas, comparatively large doses of the tincture of the chloride are well borne (♏xl–f℥j every two hours) and exert almost a specific effect, rapidly checking the course of the disease.

FICUS (U. S. P.).—**Fig.**

Pharmacology.—The fig-tree is a native of the south of Europe and is cultivated in the southern part of the United States. The officinal part is the dried fruit, or, rather, the fleshy receptacle of Ficus carica (Urticaceæ), bearing fruit upon its inner surface. Figs are used as food, and contain 62 per cent. of sugar, with gum, fat, salts, etc. Confection of senna contains 12 per cent. of figs.

Therapy.—Figs are slightly laxative, and may be used as a dessert to correct a tendency to constipation, especially in children. The seeds act mechanically in stimulating peristalsis. Split open and heated, they may be used, particularly in the mouth, to fulfill the indications of a poultice.

FŒNICULUM (U. S. P.).—**Fennel-Seed.**

Preparations.

Oleum Fœniculi (U. S. P.).—Oil of Fennel. *Dose*, ♏v–xv.
Aqua Fœniculi (U. S. P.).—Fennel-Water. *Dose*, fʒii–℥j.
Spiritus Fœniculi.—Spirit of Fennel. *Dose*, fʒss–j.

Pharmacology and Therapy.—The fruit of Fœniculum vulgare (Umbelliferæ) contains an agreeable volatile oil (3 per cent.), which is used as a flavoring and carminative. It is an ingredient in the compound infusion of senna, compound licorice-powder, and compound spirit of juniper. Fennel-tea (infusion) is used to relieve colic in infants and in dysmenorrhœa. The oil may be added to purgative medicines for the purpose of preventing griping. Fennel has been thought to have an influence in promoting the secretion of milk.

FRANGULA (U. S. P.).—**Frangula, Buckthorn.**

Preparations.

Extractum Frangulæ Fluidum (U. S. P.).—Fluid Extract of Frangula. *Dose*, fʒss–j.
Extractum Frangulæ.—Extract of Frangula. *Dose*, gr. iii–viij.

Pharmacology.—The bark of Rhamnus frangula (Rhamnaceæ), collected at least one year before being used. It is a European species of a plant of which this country has a valuable variety in the California buckthorn, or Cascara sagrada. (See Rhamnus Purshiana.) It contains a lemon-yellow, odorless, and tasteless glucoside, **Frangulin** (or rhamnoxanthin), insoluble in water, but soluble in alcohol or ether. The recent

bark contains a gastro-intestinal irritant, which is lost or modified by age, and therefore it is directed that only bark that has been dried for a year shall be used. Old bark contains **Emodin,** probably the most valuable constituent. The fluid extract is made with dilute alcohol, and better represents the bark than the preparations made simply with water, as the decoction (1 to 16) or the extract.

Therapy.—Frangula is a good laxative or purgative, resembling senna in its action. It can be used during pregnancy and is improved by the addition of a small amount of some aromatic to prevent griping.

FRANKENIA.—Frankenia, Yerba Reuma.

Pharmacology and Therapy.—A California plant, the Frankenia grandiflora (Frankeniaceæ), is recommended as a mild astringent. It is best given as a fluid extract, made with dilute alcohol, in diseases of the mucous membranes, as catarrh, leucorrhœa, gonorrhœa, etc. **Dose,** ♏x–xv.

FRASERA.—Frasera, American Columbo.

Pharmacology and Therapy.—The root of Frasera Walteri (Gentianaceæ) contains a bitter principle, **Gentiopicrin,** and a yellow, crystallizable substance, **Gentisic acid.** It is used like gentian and other vegetable bitters. The fluid extract (alcoholic) is the best preparation. **Dose,** ♏xxx–f℥j, several times daily, as a bitter tonic and gastric stimulant.

FUCHSIN.—Fuchsine, Rosaniline Hydrochlorate.

Pharmacology and Therapy.—A derivative of aniline, of special interest from the beautiful magenta-red solution which its greenish crystals make with water. Like other preparations of this group, it may be contaminated with arsenic. When administered internally, it colors the urine and the saliva; and also the fluids of the body, since the vision is affected (chromatopsia). It is claimed to have some influence over chronic kidney disease and that some cases of albuminuria have been arrested by it (given in doses of gr. ss–iv daily, with some vegetable extract).

FUCUS VESICULOSUS.—Fucus, Bladder-Wrack, Gulf-Weed.

Pharmacology and Therapy.—Fucus vesiculosus is an alga, or unicellular plant, growing to immense size, forming masses of sea-weed in the Atlantic Ocean, found principally in the Gulf-stream. It occurs in dried pieces of dark-brown or greenish color, with a disagreeable, fishy odor, and a mucilaginous, bitter, sea-water taste. It contains mucilage, a bitter extractive, small amounts of iodine and bromine, with chlorides, phosphates, etc. It is supposed to be alterative and to have the power of reducing obesity, probably from the observation that pigs feeding upon

it in Ireland do not fatten. It has been used with some success in enlarged scrofulous glands, bronchocele, and psoriasis. The decoction (1 to 16) may be used before meals to take away the appetite for food, or if used warm it acts as an emetic. The fluid extract and solid extract are irrational preparations; the only form in which to obtain the effects of the plant is the recent decoction.

GALANGA.—Galanga.

Pharmacology.—The Alpinia officinarum (Zingiberaceæ) is a native of China, where the root is prized as a medicine. It is aromatic, resembling ginger and anise, and contains a volatile oil and an acrid resin.

Galanga is stimulating and carminative, resembling ginger or cubeb. It is an ingredient in the powder for colds or catarrhs, "catarrh-snuff," and is also used in lozenges for pharyngitis and coughs.

GALBANUM (U. S. P.).—Galbanum.

Preparations.

Emplastrum Galbani (U. S. P.).—Galbanum-Plaster.

Pilulæ Galbani Compositæ (U. S. P.).—Compound Galbanum Pills (containing galbanum, gr. iss; myrrh, gr. iss; asafœtida, gr. ss). *Dose*, ii–iij.

Pharmacology.—Galbanum is a gum-resin from Ferula galbaniflua, a native of Persia, and probably from other allied plants (Umbelliferæ). It contains a volatile oil (6 to 9 per cent.), resin (60 to 67 per cent.), and gum (19 to 22 per cent.). The resin contains sulphur. By fusion with caustic potash, galbanum produces resorcin.

Therapy.—As a local application, it is stimulant, and the plaster is used as a counter-irritant and resolvent over old swellings. Asafœtida may be combined with it, as in the officinal asafœtida plaster. Internally, it is an expectorant and antispasmodic. The compound pills of galbanum may be used in chronic bronchitis; also in chronic rheumatism and rheumatic affections. Some emmenagogue power has been attributed to the compound pills of galbanum.

GALLA (U. S. P.).—Galls, Nutgall.

Preparations.

Tinctura Gallæ (U. S. P.).—Tincture of Galls (20 per cent.). *Dose*, f℥ss–j.

Unguentum Gallæ (U. S. P.).—Ointment of Galls (10 per cent.).

Pharmacology.—Galls are excrescences on the oak, Quercus lusitanica, variety Infectoria (Cupuliferæ), caused by the punctures and deposited ova of the gall-fly, Cynips gallæ tinctoria (class, Insecta; order, Hymenoptera). Galls are hard, irregularly-spherical bodies, heavy and brittle. Externally, they are dark-green or gray; internally, yellowish-gray and dark in the centre, with a central cavity. The

important constituents are tannic acid (40 to 75 per cent.) and gallic acid (2 to 3 per cent.). The Aleppo galls are the best; light-colored, spongy bulbs are inferior. Their preparations are incompatible with metallic salts and generally form insoluble precipitates with alkaloids.

The powdered galls are very astringent locally to the skin and to the gastro-intestinal mucous membrane. Stockman doubts if they exert any astringent effect in the blood or by systemic action; any such action he considers as merely reflex, from the effect upon the stomach.

Therapy.—In the form of ointment, galls are used as an application to hæmorrhoids; a drachm of powdered opium to each ounce of gall ointment is a good addition for this purpose. Nutgall ointment is also a useful dressing to indolent ulcers, to eczema of the scalp after the scales have been removed, to herpes, fissured nipples, chilblains, and alopecia circumscripta. It is also serviceable in prolapse of the rectum. The tincture of galls may be used, diluted with water, as a wash or gargle; but, for internal use, gallic or tannic acid (see pages 373 and 394) are preferable. An infusion or decoction is sometimes made use of as an enema in diarrhœa and dysentery. The aromatic syrup of galls (containing galls, cinnamon, ginger, brandy, and sugar) is a pleasant astringent for children (dose, ♏xxx–ʒj).

GAULTHERIA (U. S. P.).—Partridge-Berry, Wintergreen, Tea-Berry.

Preparations.

Oleum Gaultheriæ (U. S. P.).—Oil of Gaultheria. *Dose*, ♏ii–xx.

Spiritus Gaultheriæ (U. S. P.).—Spirit of Gaultheria (3 per cent. in alcohol). For flavoring.

Pharmacology.—The Gaultheria procumbens (Ericaceæ) is a small plant growing in the woods in North America; the leaves are officinal; they contain a **volatile oil, Arbutin, Urson, Ericolin, tannic acid,** etc. The taste is aromatic, slightly bitter and astringent; the flavor is agreeable. The volatile oil consists principally of **Gaultherilene** and methyl salicylate (90 per cent.), which yields a pure salicylic acid. The oil of sweet-birch is frequently sold for oil of gaultheria and is chemically identical with it, according to Proctor and Köhler. It is sometimes fraudulently adulterated with oil of sassafras.

Therapy.—The oil of gaultheria is antiseptic and antipyretic. It may be used in doses of ♏x–xx in articular rheumatism as a substitute for salicylic acid. The decoction of the leaves or a fluid extract may be used in bowel disorders as an astringent. The infusion is in some parts of the country used as a substitute for tea at the table. It is also used as a galactagogue and emmenagogue. It is a good addition to liniments for rheumatic pains and swollen joints.

GELSEMIUM (U. S. P.).—**Gelsemium, Yellow Jasmine.**
Dose, gr. ii–xx.

Preparations.

Extractum Gelsemii Fluidum (U. S. P.).—Fluid Extract of Gelsemium. *Dose*, ♏ii–x.
Tinctura Gelsemii (U. S. P.).—Tincture of Gelsemium (15 per cent.). *Dose*, ♏v–xx.
Gelsemina.—Gelsemine. The active principle. *Dose*, gr. $\frac{1}{200}$–$\frac{1}{60}$.

Pharmacology.—The rhizome and rootlets of Gelsemium sempervirens (Loganiaceæ), a climbing-plant, growing in the southern portion of the United States, contain an alkaloid, **Gelsemine,** which is amorphous, bitter, soluble in alcohol and ether, sparingly in water, and a volatile oil, resin, gelseminic acid, etc.

Physiological Action.—It has no special local action beyond slight sedative influence or astringency. Internally, it is a powerful motor depressant and sedative, motion being affected before sensibility in warm-blooded animals. It acts especially upon the centres in the spinal cord and medulla. Small doses occasion injection of the conjunctivæ, pain in the eyelids, contraction of pupils (if locally applied or in very large doses it may cause dilatation), with drooping of the upper lid, or, more decidedly, vertigo and confusion of vision. Larger doses exert a paralyzing influence upon the spinal cord; the power of voluntary movement is progressively lost, numbness and staggering gait being observed as preliminary symptoms. Reflex irritability is lowered, the pupils dilate, and the sensory columns of the cord become paralyzed. No brain symptoms are produced directly, but the cerebral functions may be disturbed by the accumulation of carbonic acid in the blood, the result of paralysis of muscles of respiration. Death results from asphyxia. In animals convulsions may appear. Little effect is observed upon the heart directly; the pulse-rate is lessened by lowering the excitability of the excito-motor ganglia of the heart (Ott) and the arterial pressure by diminution of vasomotor tonus. It produces a decided lowering of the bodily temperature and is diaphoretic. There are languor, muscular depression, and prostration.

Poisoning.—In cases suffering with toxic symptoms from an overdose, diffusible stimulants, hot drinks, friction to the surface of the body, and artificial respiration are useful, after evacuation of the contents of the stomach. Hypodermatic injections of morphine and atropine are antagonistic to gelsemium. Tannic acid and caustic alkalies and their carbonates are chemically incompatible. In case of poisoning with gelsemium, the stomach should be promptly emptied by an emetic or the stomach-pump. External heat should then be employed, together with cardiac and respiratory stimulants, as digitalis, ammonia, atropine, and strychnine.

Therapy.—Gelsemium may be given to allay excessive nervous irritability, as in neuralgia, ovaralgia, tic douloureux, and in some cases of myalgia. Gelsemium will often allay the pain of dental neuralgia. In facial neuralgia, comparatively large doses of the tincture (♏x–xx), every two hours, are well borne. It has also been proposed as a remedy for tetanus, and might be useful in hydrophobia to control the spasms. Ringer has found the tincture, in 10-minim doses thrice daily, beneficial in some cases of Menière's disease. The same preparation, in 5-drop doses every quarter of an hour, will sometimes arrest an attack of bilious colic. In the spasmodic stage of whooping-cough, in asthma, laryngismus stridulus, and torticollis, gelsemium has given relief. It is of service in migraine and in headache from eye-strain, in maniacal paroxysms, mania a potu, and insomnia. Certain fevers, notably cerebro-spinal and remittent, are benefited by the administration of gelsemium. When acute eczema is accompanied by considerable constitutional reaction gelsemium may be given with marked advantage. This agent, likewise, especially when administered at bed-time, relieves the itching of eczema. It allays the pain of dysmenorrhœa, favors dilatation of a rigid os in labor, and quells after-pains. It is of considerable service in the treatment of hæmoptysis. It is used in small doses as an antispasmodic in coughs, and in pneumonia and pleurisy. It is safer, on account of possible idiosyncrasy, to begin with very small doses of the tincture or extract, and gradually increase until slight drooping of the eyelid shows the beginning of full physiological effect. Gelsemium may be employed locally in the treatment of prurigo in the form of fluid extract, diluted. It has been also used as a mydriatic in eye practice.

GENTIANA (U. S. P.).—**Gentian.**

Dose, gr. viii–xxx.

Preparations.

Extractum Gentianæ (U. S. P.).—Extract of Gentian. *Dose*, gr. iii–xv.

Extractum Gentianæ Fluidum (U. S. P.).—Fluid Extract of Gentian. *Dose*, ♏xxx–f℥j.

Tinctura Gentianæ Composita (U. S. P.).—Compound Tincture of Gentian contains gentian 8, bitter orange-peel 4, cardamom 2, dilute almond q. s. ad 100 parts). *Dose*, fℨi–iv.

Elixir Gentianæ Ferratum.—Ferrated Elixir of Gentian. *Dose*, fℨi–iv.

Elixir Gentianæ et Ferri Phosphatis of the National Formulary contains phosphate of iron, gr. viij; gentian, gr. xvj; in each f℥j. *Dose*, fℨi–iv.

Infusum Gentianæ Compositum.—Compound Infusion of Gentian (contains gentian 10, bitter orange-peel 2.50, coriander 2.50, in dilute alcohol, 1 to 10, q. s. ad 320 parts). *Dose*, f℥ss–j.

Pharmacology.—Gentian is the root of Gentiana lutea (Gentianaceæ), a native of Europe. Many species are indigenous, as the Gentiana puberula, Gentiana saponaria, Gentiana Andrewsii, and the beautiful Gentiana crinita, which differ in therapeutical effects only in degree from

the officinal gentian, and may be employed for like purposes. Both water and alcohol dissolve the active principle, which is very bitter, and appears to be a glucoside, **Gentiopicrin,** combined with **gentisic acid,** a coloring ingredient. There is no tannin present; although the preparations are darkened by most of the iron salts (the citro-chloride is excepted), due to a change in this coloring matter, probably. Of the American varieties a decoction or infusion may be used, although a fluid extract would better represent the drug.

Physiological Action.—Gentian is a simple bitter, with little, if any, astringency, and has the same physiological action as others of this class. When combined with an alkali its local effects upon the stomach are much increased. Gentian has been thought to exert a slight stimulant effect upon the liver. The chalybeates are synergistic, with reference to general tonic effects. It enjoys a reputation as a succedaneum for cinchona, as an antipyretic and antiperiodic, though to a less marked degree; its actions have not been as much studied as those of the latter. No toxic effects have been noted.

Therapy.—As a stomachic tonic, the preparations of gentian are deservedly esteemed in cases of weak stomach during convalescence, catarrhal gastric disorder in infants, or ordinary atonic dyspepsia:—

℞ Sodii bicarb., ... ʒiv.
Infusi gentianæ comp., ... f℥vj.
M. Sig.: A tablespoonful or two half an hour before meals.

The compound infusion of gentian is a good vehicle for administration of potassium iodide in cases where its tonic effects would be useful. Combinations of gentian and iron are numerous, but none are used so much as the ferrated tincture of gentian (not officinal):—

℞ Tincturæ gentianæ, ... f℥iv.
Tincturæ ferri citro-chlorid. (N. F.), ... f℥j.
M. Sig.: Two teaspoonfuls after each meal.

The gentian mixture officinal in the British Pharmacopœia is, according to Whitla, excelled by few remedies in the treatment of the vomiting of pregnancy, especially when combined with a mineral acid.

The infusion, or decoction, is useful as a stomachic in gastric disorders associated with gout or malarial fever, or the compound tincture may be used where the alcohol is not objectionable:—

℞ Tincturæ cinchonæ,
Tr. cardamom. comp., ... āā f℥j.
Tr. gentianæ comp., ... f℥ij.
M. Sig.: A dessertspoonful to a tablespoonful in malarial dyspepsia and debility with loss of appetite.

Gentiana Quinquefolia.—The five-flowered gentian is common in the United States. The whole plant is bitter, and may be given in infusion, but a fluid extract would be better (dose, ♏v–xxx). It may be used for the same purpose as the preceding.

GERANIUM* (U. S. P.).—**Geranium, Cranesbill.**
Dose, gr. xv–ʒj.

Preparations.

Extractum Geranii Fluidum (U. S. P.).—Fluid Extract Gentian. *Dose*, ♏xxx–f℥j.
Extractum Geranii.—Extract of Geranium. *Dose*, gr. i–v.

Pharmacology.—An indigenous plant, found in the woods from Canada to Florida, of which the rhizome only is officinal. The spotted geranium, as it is called, or Geranium maculatum (Geraniaceæ), contains tannic (13 to 17 per cent.) and gallic acids, which are its most important constituents, besides some resin, gum, starch, pectin, coloring matter, etc. As it imparts its virtues to both water and alcohol, it may be used in decoction and tincture, as well as in the officinal fluid extract, which is made with dilute alcohol.

Physiological Action and Therapy.—Geranium improves the appetite and digestion and promotes nutrition. As it is decidedly astringent, the drug may be used, in fine powder, as a styptic in hæmorrhages after extraction of a tooth, epistaxis, etc. Its astringency renders it an excellent hæmostatic. The writer has obtained good results from the local application of the fluid extract, diluted with 3 or 4 parts of water, in buccal ulcer, fissure of the anus, and metrorrhagia. The same treatment promptly arrested a hæmorrhage from the urethra and at the same time cured a rebellious gleet which had been in existence for two years. Geranium makes a useful throat- and mouth- wash:—

℞ Potassii chloratis,	ʒij.
Ext. geranii fl.,	f℥vj.
Glycerini,	f℥j.
Aquæ rosæ,	q. s. ad f℥vj.

M. Sig.: Add a tablespoonful to two tablespoonfuls or more of water, and use as a gargle.

In catarrhal inflammations, as an injection in gonorrhœa, gleet, and leucorrhœa, the decoction is more serviceable, according to Prof. L. Johnson, than a simple solution of tannin, doubtless from the fact that there is present mucilaginous material, which acts as a demulcent. The fluid extract is useful internally in diarrhœa. In infantile diarrhœa, the decoction may be very acceptably administered in milk, which covers its taste. It is a valuable remedy in the early stages of phthisis, diminishing cough and expectoration, reducing the fever and pulse-rate, checking

*See paper by author in the Atlanta Medical and Surgical Journal, October, 1889.

night-sweats and hæmoptysis. Under its use the appetite improves and the patient gains in weight. In a rapid case of phthisis, accompanied by profuse night-sweats, complete loss of appetite, and a severe, harassing cough, marked temporary relief was obtained by the following prescription :—

℞ Ol. menth. pip.,	♏xx.
Ext. geranii fl.,	f℥iss.
Vini Portensis,.	f℥j.

M. Sig.: Teaspoonful every third hour.

Geranium is mild and unirritating, and especially suited to the later stages of diarrhœa and dysentery in children. It has also been employed in internal hæmorrhages, with good results.

GEUM.—Avens.

Preparation.

Extractum Gei Fluidum.—Fluid Extract of Avens. *Dose*, ♏xx–f℈j.

Pharmacology.—Two species of Geum (Rosaceæ) are used in medicine,—the Geum urbanum, or European avens, and the Geum rivale, or water avens, a native of North America. In each, the root is the part possessing medicinal properties. Geum contains a bitter principle called **Gein** by Buchner, a little volatile oil, a large proportion of tannic acid (10 to 40 per cent.). A recent infusion or decoction would best represent the physiological action of geum, though a fluid extract made with dilute alcohol is also used.

Therapy.—Avens is tonic and astringent. It is chiefly useful in relaxation of mucous membranes. An infusion made with boiling water is given for diarrhœa.

GILLENIA.—Gillenia, American Ipecacuanha.

Dose, gr. v–xxx.

Preparation.

Extractum Gilleniæ (Trifoliatæ) Fluidum.—Fluid Extract of Gillenia (Trifoliata). *Dose*, ♏v–xxx.

Pharmacology.—The Gillenia trifoliata, or Indian physic, and Gillenia stipulaceæ, which is a species closely resembling it, were formerly officinal, but have been dropped from the pharmacopœia, as they are very inefficient substitutes for ipecacuanha. They belong to the natural order Rosaceæ, and are indigenous to this country, growing from Canada to Georgia. The part used is the root, which contains **Gillenin**, a peculiar bitter principle, to which its therapeutic properties are due. It also contains tannic acid, gum, resin, starch, etc.

Physiological Action and Therapy.—Gillenia is an active emetic, and in small doses is thought to resemble ipecacuanha as a tonic and cholagogue, and is also diaphoretic and expectorant.

It has been used as a substitute for ipecacuanha, as an emetic, stomachic tonic, and diaphoretic, and in domestic practice in dyspepsia, etc.

GLYCERINUM (U. S. P.).—**Glycerin.**
Dose, f ℥i–iv.

Preparations.

Glyceritum Amyli (U. S. P.).—Glycerite of Starch (glycerin 90, starch 10 parts). For external use.

Glyceritum Vitelli (U. S. P.).—Glyconin (glycerin 55, egg-yelk 45 parts). For external use.

Glyceritum Acidi Tannici.—Glycerite of Tannic Acid (gr. xx–lx in f℥j). For external use.

Glycerolum Pepsini.—Glycerole of Pepsin (♏j = saccharated pepsin, gr. ij). *Dose,* ♏ii–x.

Glyceritum Pepsini Vitulini.—Glycerite of Calf-Pepsin. *Dose,* ♏xxx–f℥j.

Boro-Glyceridum.—Boro-Glyceride (boric acid 62, glycerin 92 parts).

Nitro-Glycerinum.—Nitro-Glycerin, Glonoin. *Dose* (in solution or tablet), gr. $\frac{1}{100}$.

Glycerin is also a constituent in several extracts, fluid extracts, pill masses, mucilage of tragacanth, solution of pepsin, and other pharmacopœial preparations.

Pharmacology.—Officinal glycerin is a liquid obtained by the decomposition of fats or fixed oils, and containing not less than 95 per cent. of absolute glycerin. In the process for making lead plaster, the olive-oil, being decomposed by the lead oxide, yields lead oleate and free gleeryin. It is also produced in the ordinary process of soap-making, being a constituent of the waste, from which it is now recovered in large quantities for commercial purposes. A purer glycerin is obtained by decomposing fats by steam, or superheated water, and distillation. A superior article is made from vegetable fats by Messrs. Proctor and Gamble, of Cincinnati, which is best adapted for medical use. Pure glycerin is a trihydric alcohol, is clean and colorless, resembling syrup, oily to the touch, without odor, very sweet, slightly warm to the taste, neutral in reaction, hygroscopic, soluble in all proportions in water or alcohol, and insoluble in ether, chloroform, benzole, or fixed oils. Under certain conditions it becomes a mass of dense, brilliant crystals, but may be cooled to — 40° C. without congealing, only becoming more viscid. Treated with strong nitric acid, it forms glonoin, or nitro-glycerin,—a substance of powerful explosive properties. (See page 439.)

Physiological Action.—As it has an affinity for water, glycerin absorbs the latter from mucous surfaces and excites secretion. It is irritating in its concentrated state to both skin and mucous membrane, being entirely different in its effects from oils or fats, although, when diluted, it keeps the skin moist and prevents cracking or chapping. Glycerin is absorbed by the skin and passes into the blood. It has very little effect upon the stomach. A certain amount is absorbed, with the effect of

increasing nutrition and improving the appetite; it is slightly laxative, and is said to lessen the excretion of urea, though, according to the experiments of Lewin, it exerts no influence upon the quantity of urea eliminated. Large doses have produced hæmoglobinuria, owing to some action, as yet unexplained, upon the blood. Glycerin is considered antiseptic, yet Koch found that it did not destroy spores nor the activity of formed ferments, although a solution in water (1 to 3) arrests the action of some enzymes (pepsin, ptyalin, emulsin), and a stronger solution (1 to 2) prevents the action of others (myrosin, diastase, invertin), but preserves their activity unimpaired, and is used to preserve them (Wernitz). Glycerin is destructive to parasites, intestinal and external. It increases the action of codliver-oil, and is a solvent for some of the alkaloids, though not for others. Owing to its sweetness, it has been used as a substitute for sugar in the diet of diabetics, though saccharin has now largely taken its place. According to the clinical observations of Pavy, glycerin increases polyuria, and he therefore opposes its use as a substitute for sugar. It seems to augment considerably the quantity of glycogen contained in the liver, though it probably prevents the transformation of glycogen into sugar.

Glycerin can be combined with admirable effect as follows:—

℞ Glycerini,
Liquor. calcis,
Aquæ rosæ, ... āā f℥ij.

M. For excoriations, erythema, superficial burns, and scalds.

℞ Glycerini,
Aquæ hamamelidis dest.,
Aquæ rosæ, ... āā f℥ij.

M. Use on chapped face and hands, sore nipples, and hæmorrhoids.

℞ Glycerini,
Aquæ hamamelidis dest., ... āā f℥iij.
Bismuth. subnit. vel sodii bicarbonatis, ... ʒij.
Acidi carbolici, ... ♏x.

M. For erythematous or vesicular eczema, burns, and seborrhœa, especially around the axilla and genital organs.

℞ Glycerini,
Acidi lactici,
Aquæ rosæ, ... āā f℥ss.

M. For freckles and other pigmentations of the skin.

℞ Glycerini, ... f℥v.
Creasoti, ... fʒj.
Ol. menth. pip., ... ♏x.

M. Valuable for catarrh, pharyngitis, and laryngitis, in the form of a spray. It can be mopped on the skin or sprayed over the surface for pruritus, eczema, and urticaria.

Therapy.—Diluted with 3 parts of rose-water, glycerin is a good application to the hands and lips to prevent chapping during cold weather. Glyconin is also used for this purpose. The same mixture is one of those employed in ichthyosis, after a warm-water, hot-air, or vapor bath, in order to protect the diseased area and aid in maintaining its nutrition. In more concentrated form it has been used with success in pityriasis, pruritus, acne, eczema, fissured nipples, or acute coryza, applied with a brush or spray. In combination with collodion (½ per cent.) it forms collodium elasticum, which is less painful than pure collodion, and is a good protective for fissures and abrasions. The glycerite of tannic or of gallic acid is a useful astringent as an application for sore throat, relaxation of mucous membrane, and upon tampons to the cervix uteri for leucorrhœa. A pledget of absorbent cotton, saturated in glycerin, is an excellent application, also, in congestion of the womb, as, on account of its affinity with water, it provokes an abundant serous transudation. The glyceritum vitelli is used as a vehicle for chloroform or heavy powders. Glycerin alone, or with some astringent or sedative, is useful in preventing bed-sores. Injected into the bowels, it is a mild enema, and in small quantities is efficient in evacuating the lower bowel, and may be introduced in the form of suppositories.

In obstruction by fæcal impaction, the injection of several ounces into the colon, through a long tube, was successful in the hands of Dr. Edward Mayer, of Wilkesbarre, Pa., in saving life after failure of all ordinary means of relief. Glycerin administered by the mouth has a peculiarly soothing effect upon inflamed and painful hæmorrhoids. Equal parts of glycerin and distilled water may be used as an application to keep the tongue moist in typhoid and other fevers; and a dilute solution may be sipped to moisten the throat during an attack of tonsillitis or pharyngitis, although the direct application by spray or brush should not be omitted. The red, dry, and glazed mouth of advanced phthisis is moistened by the use of a wash of glycerin and water. Reflex cough is often allayed by the application of glycerin to the fauces, and, administered internally in drachm doses, the same agent may prove of advantage in the cough of phthisis. It may be given to infants as a laxative in combination with oil. Administered alone, it has been used for the same purposes as codliver-oil, but is less efficient, although possessing some nutritive properties. It is the best remedy in cases of trichiniasis, administered in tablespoonful doses, as successfully used by Dr. James M. Barton; and is used as a laxative in cases of piles. Some forms of indigestion are improved by its administration after meals; and it is the best solvent and preservative for pepsin, either from the pig or the calf, the latter having been introduced by Dr. Woodbury as the special digestive

ferment for infants or adults upon a milk diet. In acidity of the stomach and flatulence, glycerin in drachm doses two or three times a day is beneficial. It is often extremely useful in improving the appetite. Glycerin given in the form of suppository is often serviceable in relieving and overcoming constipation, especially when the lower bowel is inactive. Griffith has employed it with marked effect in the treatment of constipation. An enema of glycerin and infusion of flaxseed (1 to 4) allays tenesmus in cases of acute dysentery (Bartholow). The glycerite of starch is a bland material, which can be impregnated with various medicaments, astringents, etc., for application to the eye or to the skin. Glycerin is a good vehicle for alkaloids, and it is thus used in various diseases of the ear, in abnormal dryness of the external auditory canal, and impaction of cerumen. **Boroglyceride** and its uses are discussed on pages 366 and 367.

Glycerita.—The pharmacopœial class of glycerites is limited to the glycerite of starch and the glycerite of egg-yelk, although various other medicinal combinations may be made extemporaneously. The Glycerinum Boracis (Ph. B.), containing 20 per cent. of borax, is useful in infantile thrush and in facial erysipelas, applied with a camels' hair brush.

Glycerite of the Borate of Bismuth is recommended by Keyser as a good remedy in phlyctenular and scrofulous conjunctivitis.

The urine of persons using glycerin reduces copper in Fehling's test, and is liable to lead to error, being mistaken for glycosuria. This is not due directly to the presence of glycerin, but to a decomposition product.

GLYCYRRHIZA (U. S. P.).—**Glycyrrhiza, Liquorice-Root.**
Dose, gr. v–ʒss, in powder.

Preparations.

Extractum Glycyrrhizæ (U. S. P.).—Extract of Liquorice (commercial).

Extractum Glycyrrhizæ Purum (U. S. P.).—Pure Extract of Liquorice. *Dose*, gr. v–ʒj.

Extractum Glycyrrhizæ Fluidum (U. S. P.).—Fluid Extract of Liquorice (made with aqua ammonia and dilute alcohol). *Dose*, ♏xx–fʒj.

Mistura Glycyrrhizæ Composita (U. S. P.).—Brown Mixture (pure extract 3, paregoric 12, antimonial wine 6, spirit of nitrous ether 3, sugar 3, acacia 3, water 70 parts). *Dose*, f℥ss.

Trochisci Glycyrrhizæ et Opii (U. S. P.).—Wistar's Cough Lozenges (extract liquorice, gr. ij; ext. opium, gr. $\frac{1}{20}$ in each, with ol. anise, sugar, and acacia). *Dose*, j or ij.

Pulvis Glycyrrhizæ Compositus (U. S. P.).—Compound Liquorice-Powder (senna 18, liquorice-root, powd., 16; fennel 8, washed sulphur 8, sugar 50 parts) *Dose*, fʒi–ij.

Glycyrrhizinum Ammoniatum (U. S. P.).—Ammoniated Glycyrrhizin (for flavoring).

Infusum Lini Compositum (Ph., 1870).—Compound Infusion of Flaxseed (contains flaxseed, ℥ss; liquorice-root, contused, ʒij, in a pint). *Dose, ad lib.*

Phármacology.—The Glycyrrhiza glabra (Leguminosæ) is a native of Southern Europe; its root contains an amorphous, bitter-sweet glu-

* See Medical Bulletin for June, 1890, p. 201.

coside, **Glycyrrhizin,** which is probably in combination with ammonia; it also contains **Asparagin,** sugar, resin, starch, gum, pectin, coloring-matter, etc. Glycyrrhizin, when acted upon by dilute acids, splits up into sugar and a brownish-yellow, bitter substance, **Glycyrrhetin.** The resin is also bitter.

The aromatic glycyrrhizin masks the taste of sulphate of quinine when prescribed with it in about double the quantity, but the after-taste is still bitter. The elixir of aromatic glycyrrhizin is a good vehicle in which to administer sulphate of quinine, but no acid should be added, since the quinine is largely suspended and not dissolved. Liquorice enters into the other adjuvant elixirs for the administration of bad-tasting medicines. A syrup of liquorice may be used as a flavoring agent or as a vehicle.

Physiological Action.—Liquorice-root is demulcent and slightly stimulating to the bronchial mucous membranes, and is laxative. It has an agreeable taste, the bitterness being masked by the sweet principle, but leaves an acrid taste in the fauces. The extract covers the taste of other remedies. The root is used as a dusting-powder and coating for pills.

Therapy.—The compound infusion of flaxseed (Ph., 1870) is a good demulcent in acute bronchitis and diarrhœa. The extract is useful in relieving dryness of the throat and hoarseness, especially if combined with chloride of ammonium. The troches contain gr. $\frac{1}{20}$ of opium, and may be used where an opiate is not objectionable, but are dangerous, since their pleasant taste leads children to take an overdose; one every hour is sufficient for an adult with irritable cough.

The compound mixture is a good expectorant for bronchitis, and is often combined with syrup of senega and chloride of ammonium.

In constipation, especially during pregnancy, the compound liquorice-powder is very valuable; given at night on retiring, it causes one or two natural stools in the morning, generally without griping. Where a more decided effect is desired, it may be combined with an equal portion of compound jalap-powder.

GOSSYPIUM (U. S. P.).—Cotton.

Preparations.

Gossypii Radicis Cortex (U. S. P.)—Cotton-Root Bark. *Dose*, ℥ss–j, in decoction.

Extractum Gossypii Radicis Fluidum (U. S. P.).—Fluid Extract of Cotton-Root Bark. *Dose*, f℥ss–j.

Oleum Gossypii Seminis (U. S. P.).—Cotton-Seed Oil.

Pyroxylinum (U. S. P.).—Pyroxylin. Soluble gun-cotton (for making collodion).

Collodium (U. S. P.).—Collodion. Pyroxylin dissolved in ether and alcohol.

Pharmacology and Therapy.—Cotton is a native of the southern portion of the United States, and is the hairs of the seed of Gossypium

herbaceum (Malvaceæ), and of other species of Gossypium, freed from adhering impurities and deprived of fatty matter. It is composed almost entirely of cellulose, and is in a mass of white, interlacing fibres, forming sheets of so-called carded cotton-wool. By a preliminary treatment with alkalies to extract the fatty matters, it becomes absorbent cotton, which is of great value in modern surgical practice, and has succeeded the sponge as a dressing for wounds. Absorbent cotton may be treated with various agents, so as to be of special value (carbolized, borated, salicylated, or treated with mercuric chloride, etc.). These are used to exclude air from wounds, burns, etc., and afford some support, and may also be applied to a blister after puncture. In inflammations, as in acute articular rheumatism, the part may be enveloped in cotton, either dry or moistened with anodynes, with great comfort to the patient. It is also a good material for tampons, or for making an artificial ear-drum after perforation. Cotton is much in use as a padding for splints. Dr. Whitla speaks very favorably of its use in phlegmasia dolens, enveloping the entire limb in a thick layer surrounded by oiled silk and carefully bandaged. Hæmostatic cotton may be made by dipping absorbent cotton in a solution of chloride of iron, and afterward drying and picking it, or dilute Monsel's solution may be used (1 in 24) and the cotton kept immersed in it until used as a tampon, in uterine cancer, etc.

Pyroxylinum, or gun-cotton, is officinal only as a source of collodion. (See page 565.)

The oil of the seeds is bright, pale, odorless, and free from acrid after-taste. It is a good substitute for olive-oil, and is frequently sold for it. It enters into the officinal liniments of ammonia, of lime, of camphor, and of subacetate of lead. In pharmacy it answers a similar purpose to olive-oil.

The bark of the root of gossypium contains resin, tannic acid, and a red coloring matter. A solid and a fluid extract can be obtained (both alcoholic), the dose of the former being 1 to 5 grains; of the latter, half a drachm to a drachm. A recent decoction is also used in the South. It has a special action upon the uterus, like ergot, and is employed in the same class of cases—in scanty menstruation, dysmenorrhœa, and during labor. Phillips has found it useful in hæmoptysis, and in the West Indies it is administered in dysentery.

GRANATUM (U. S. P.).—**Pomegranate.**
Dose, ʒi–ij.

Preparations.

Decoctum Granati.—Decoction of Pomegranate (4 to 16). *Dose,* f℥iv–vj.
Extractum Granati Fluidum.—Fluid Extract of Pomegranate. *Dose,* fʒi–ij.

Pharmacology.—Pomegranate is the bark of the root of Punica granatum (Granataceæ), cultivated in subtropical countries. The rind of the fruit and the bark of the stem, though not officinal, contain similar constituents, and are also useful. The liquid alkaloid, **Pelletiérine** ($\frac{1}{2}$ per cent.), is found in this plant in combination with punico-tannic acid, and to these the peculiar virtues of the bark are due. The tannic acid is largely in excess (20 to 28 per cent.).

Physiological Action and Therapy.—Pomegranate has powerful astringent properties, and a decoction flavored with orange or aromatics is useful in sore throat or pharyngitis, and as an astringent injection for gonorrhœa. The special use of this agent is for the destruction of tapeworms, for which a wineglassful should be taken every hour for three hours, to be followed by a purgative dose of castor-oil. The drug itself, in large doses, acts both as an emetic and purgative. The pelletiérine tannate, 15 grains (1 gramme) at a dose, in capsules, is an effective, but expensive, remedy. The decoction is so astringent that it may not be possible for the patient to take it, in which case the same result may be obtained by evaporating it, in a water-bath, to a pilular consistency, and administering the extract thus made in gelatin capsules, preceded and followed by a cathartic. Pomegranate has been used with success in the diarrhœa and dysentery of hot climates.

GRINDELIA (U. S. P.).—Grindelia.

Preparations.

Extractum Grindeliæ Fluidum (U. S. P.).—Fluid Extract of Grindelia. *Dose*, ♏x–f℥j.
Extractum Grindeliæ.—Extract of Grindelia. *Dose*, gr. i–v.

Pharmacology.—The leaves and flowering tops of Grindelia robusta (Compositæ), a perennial California plant, contain a volatile oil, a resin, and, possibly, an alkaloid. The plant possesses a balsamic odor, a warm, aromatic, and bitter taste. The resin is precipitated by water. The active principles are not completely extracted by alcohol, but an aqueous, alkaline solution has been found by Dr. W. P. Gibbons to be the most satisfactory menstruum.

Physiological Action.—Grindelia creates a sensation of warmth in the stomach, and, in small quantities, if not too long continued, improves the appetite and digestion. It slows the action of the heart and lungs, and augments the blood-pressure. It possesses antispasmodic and expectorant qualities. Large quantities dilate the pupil, produce a hypnotic effect, and paralyze first the sensory and then the motor nervous system. Death occurs from paralysis of the muscles of respiration. The plant, however, is but feebly poisonous. It exerts some diuretic effect.

Therapy.—Grindelia is an efficient local application in dermatitis, caused by contact with the rhus toxicodendron, or poison-ivy. Cloths dipped in a mixture of ½ drachm or a drachm of the fluid extract to 4 or 6 ounces of water, and laid upon the affected surface, will, in many instances, afford rapid relief. This mixture has also been advantageously employed upon burns and blisters. A combination with creolin is likewise efficient in these conditions:—

℞ Extract. grindeliæ fld., ... f℥ss.
Creolini, ... fʒij.
Aquæ, ... q. s. ad f℥v.—M.

An injection of the above strength is useful in vaginitis, or, applied upon absorbent cotton, in pruritus vaginæ. It may likewise be resorted to in leucorrhœa and endometritis. A weaker solution thrown into the urethra is of service in gonorrhœa and gleet. Diluted with water or glycerin, the fluid extract of grindelia is a beneficial application to chronic or irritable ulcers, and in these cases it is a good practice to conjoin the internal administration of the remedy. One part of fluid extract to four parts of water as a local dressing, together with the internal exhibition of the same preparation, has been found efficient in iritis.

As an internal remedy the chief value of grindelia is in the treatment of asthma. The paroxysm may usually be notably abridged by the administration of 20 or 30 drops of the fluid extract, repeated every twenty or thirty minutes. Two or three such doses will, in many instances, allay the spasm. After the attack has subsided, the medicine should be continued in order to avert recurrence. In the interval grindelia may very profitably be combined with other agents having similar power, as, for example:—

℞ Potassii iodidi, ... ʒvj.
Liq. potassii arsenitis, ... fʒiss.
Ext. grindeliæ fld., ... f℥ij.
Tinct. euphorbiæ pilulif., ... fʒv.
Ext. yerbæ santæ fld., ... q. s. ad f℥iv.
M. et ft. sol.
Sig.: Teaspoonful three times a day. For asthma and chronic bronchitis.

Grindelia is eliminated in part by the bronchial mucous membrane, which it stimulates. It is an excellent expectorant in chronic bronchitis, and hence when this condition, as is so often the case, complicates emphysema and asthma, grindelia is no less efficacious than in pure nervous asthma. It relieves cough and promotes expectoration in chronic pneumonia. It is sometimes of advantage in ameliorating the cough of phthisis. In shortness of breath due to anæmia, and in some cases of dyspnœa dependent upon valvular disease of the heart, grindelia has

proved beneficial. In certain cases of hay fever this remedy has been used successfully. The paroxysms of whooping-cough are diminished in frequency and mitigated in severity by the administration of grindelia. As it escapes from the system principally by the kidneys, it exerts a favorable influence upon pyelitis and chronic cystitis. The dried leaves may be moistened with nitre solution, and, mixed with a little tobacco, rolled into cigarettes for use in asthma.

Grindelia squarrosa is an allied plant, considered by some as a mere variety of the preceding, contains similar constituents, and is used for same purposes, but has some reputation also for the cure of malarial affections.

GUAIACUM.—Guaiac.

Preparations.

Guaiaci Lignum (U. S. P.).—Guaiac-Wood. The heart-wood of Guaiacum officinale and of Guaiacum sanctum (Zygophyllaceæ).

Guaiaci Resina (U. S. P.).—Guaiac. The resin of the wood of Guaiacum officinale. *Dose*, gr. v–xv.

Tinctura Guaiaci (U. S. P.).—Tincture of Guaiac (resin, 20 per cent.). *Dose*, ♏x–f℥j.

Tinctura Guaiaci Ammoniata (U. S. P.).—Ammoniated Tincture of Guaiac (resin 20, aromat. spts. of ammonia 80 parts). *Dose*, ♏x–f℥j.

Pilulæ Antimonii Compositæ (U. S. P.).—Compound Antimonial Pills. (Contain resin of guaiac, gr. i, and sulphuretted antimony and calomel, each, gr. ½).

Pharmacology.—The wood of guaiac, or lignum-vitæ, enters into two officinal preparations of doubtful value, the compound decoction of sarsaparilla and the compound syrup of sarsaparilla, formerly in repute as alteratives, but seldom used at present except as a vehicle for potassium iodide, to cover its unpleasant taste. The resin is the most important constituent of the wood (20 to 25 per cent.), from which it is obtained by heating or by boiling with water. The resin contains **Guaiacetic acid** (10 per cent.), **Guaiaconic acid** (70 per cent.), **Guaiacic acid** (a small quantity), and **Beta-Guaiac resin** (10 per cent.), with some **Guaiac yellow.** The active principles are insoluble in water, but soluble in alcohol and alkaline fluids.

Physiological Action.—It is esteemed to be alterative and expectorant, but the taste is so unpleasant as to greatly limit its use in medicine. It is a gastro-intestinal irritant, stimulating the liver, and is stated by some to act also on the excretory organs of the skin; and, when it fails to act upon the skin, is diuretic. Dr. Murrell finds it an efficient laxative.

Therapy.—Guaiac was formerly used as an alterative and antisyphilitic, but it is not much valued for this at present,—only as an ingredient in the compound preparations of sarsaparilla, which are used as vehicles for the iodides. In tonsillitis, frequent small doses of the tincture will sometimes cut an attack short. In various neuralgic and rheumatic

affections, in rheumatoid arthritis, in amenorrhœa, and in dysmenorrhœa, it is also very useful. In rheumatic sore throat, the ammoniated tincture may be administered internally, and added to hot water makes a good gargle. Good results are sometimes obtained from guaiac in chronic gout, gouty bronchitis, and lumbago. The ammoniated tincture is regarded as the best preparation; it may be given in milk, in glyceritum vitelli, or in aromatic elixir of liquorice. In chronic constipation Murrell* has obtained very satisfactory results from the administration of the resin in 10- or 20- grain doses, in ½ ounce of thick extract of malt, two or three times daily, according to the case. It occasionally produces a rash. Murrell advises the trial of a triturate with cream of tartar, sugar of milk, or some other inert substance.

GUARANA (U. S. P.).—**Guarana.**

Preparation.

Extractum Guaranæ Fluidum (U. S. P.).—Fluid Extract of Guarana. *Dose*, ♏x–f℥j.

Pharmacology.—A dried paste prepared from the crushed or ground seeds of Paullinia sorbilis (Sapindaceæ), a climbing plant of Brazil. It is in round masses or cylindrical sticks, resembling chocolate in color and odor. It contains **Guaranine** (5 per cent.), an alkaloid probably identical with **Caffeine,** besides **tannic acid** (25 per cent.), traces of volatile oil, saponin, etc.

Physiological Action.—The physiological effects are the same as those of coffee or chocolate, but it is of very uncertain strength.

Therapy.—The principal use of guarana is in nervous headache, ½-drachm doses of the fluid extract being administered every hour during the beginning of the attack. It has also been used in diarrhœa.

GURJUN.—Gurjun Balsam or Oil, Wood-Oil.

Dose, ♏x–f℥ij, in emulsion or capsules, or with extract of malt.

Pharmacology.—An oleoresin obtained from the Dipterocarpus turbinatus and other species of Dipterocarpaceæ of East India. The balsam flows from the wounded tree. It contains from 40 to 70 per cent. of volatile **oil,** some **resin,** and **Gurjunic acid.** It resembles copaiba in physical and physiological properties, but is more acceptable to the digestive organs and has less effect upon the kidneys.

Therapy.—Gurjun-oil is antiseptic and alterative. In combination with lime-water (1 to 4) it is a useful application in psoriasis and chronic eczema. It has been employed in leprosy, both internally and locally, with asserted curative effect. The oil has been administered successfully in the treatment of gonorrhœa and gleet, also in chronic bronchitis.

* Medical Bulletin, January, 1891, "Guaiacum as a Laxative," by William Murrell, M.D., of London, England.

GUTTA-PERCHA (U. S. P.).—**Gutta-Percha.**

Preparation.

Liquor Guttæ-Perchæ (U. S. P.).—Solution of Gutta-Percha (gutta-percha 9 per cent., lead carbonate 10, in chloroform). Used externally.

Pharmacology.—The concrete exudation of Isonandra gutta (Sapotaceæ), a tree of the East Indies. It is insoluble in water or in alcohol, but soluble in chloroform, oil of turpentine, and bisulphide of carbon. Softens easily and can be cut with a hot knife.

Therapy.—Used externally in sheets for making molded splints, as, after softening with hot water, it adapts itself to the surface and soon hardens again. It is also used in making mechanical appliances such as pessaries, specula, etc. The solution is used as a protective, like collodion.

HÆMATOXYLON (U. S. P.).—**Hæmatoxylon, Logwood.**

Preparations.

Decoctum Hæmatoxyli (U. S. P.).—Decoction of Logwood (℥i-Oj). *Dose*, f℥i-f℥ij.

Extractum Hæmatoxyli (U. S. P.).—Extract of Logwood. *Dose*, gr. v-x.

Pharmacology.—Logwood is the heart-wood of Hæmatoxylon campechianum (Leguminosæ), a large tree of Central America and the West Indies. It occurs as chips or raspings of a reddish-brown color. Tannin is the principal medical constituent. It also contains **Hæmatoxylin** (12 per cent.), a red coloring constituent resembling liquorice in its taste, which is soluble in water and in alcohol.

Physiological Action.—Hæmatoxylon is astringent and tonic, and unirritating. It colors the urine and stools red, and has the disadvantage of staining the linen. It does not produce constipation.

Therapy.—Formerly used as an astringent for children's diarrhœas, but, as the medicine was occasionally spilt or vomited upon the clothing, it was productive of much dissatisfaction, and was abandoned, especially since the new dietetic and antiseptic method has come into vogue. Nevertheless, it is of decided value in tuberculous diarrhœa, and should not be entirely overlooked. The decoction has been used as an astringent in leucorrhœa and bleeding hæmorrhoids.

HAMAMELIS* (U. S. P.).—**Hamamelis, Witch-Hazel.**

Preparations.

Extractum Hamamelidis Fluidum (U. S. P.).—Fluid Extract of Hamamelis. *Dose*, ♏x-f℥j.

Aqua Hamamelidis Destillata.—Distilled Extract of Witch-Hazel. *Dose*, f℥i-ij.

* See papers by the author on "Hamamelis Virginica," read before the British Medical Association, Section of Therapeutics, at Brighton, August, 1886—The Medical Register, June 4, 1887; "Hamamelis in the Treatment of Diseases of the Skin," read before the Section of Dermatology at the meeting of German Naturalists and Physicians, held in Berlin, September, 1886—The Medical Bulletin, December, 1886. See also paper on "Hamamelis and Alcohol," by Dr. E. H. Griffin—Medical Record, December, 1890.

Pharmacology.—The leaves of Hamamelis Virginica (Hamamelaceæ) collected in autumn are officinal, and, although not stipulated by the pharmacopœia, they should be **fresh,** as they owe their efficacy largely to some volatile principle not yet isolated; they also contain tannin and a bitter extractive coloring matter, etc. The old leaves and many preparations are devoid of physiological activity, but a well-made fluid extract, and especially the distilled extract, have been found to have decided therapeutic power. The bark of the younger branches is more astringent than the leaves; it contains about 8 per cent. of tannin, and can be used for the same purposes as the leaves. It is probable that the popular distilled extract is made from the leaves and smaller twigs, freshly gathered and treated with dilute alcohol before distillation. Some of the undoubted good results of this agent as a local application, as a wash, a gargle, etc., may be due to the alcohol present.

Physiological Action.—Negative physiological results from an investigation of the root have been reported by Wood and Marshall. These observers think that the so-called virtues of the preparations of witch-hazel depend upon the alcohol they contain and the faith of the patient. Dujardin-Beaumetz, on the other hand, believes that witch-hazel owes its utility to an action on the muscular fibres of the veins. Hector Guy (*Thèse de Paris*, 1884) reports, after experiments with witch-hazel, that it shows no special physiological action on the vascular system, but that headache sometimes follows full doses.

Therapy.—For sprains, bruises, and superficial inflammations, the distilled extract is a pleasant and valuable application. It is also useful diluted with 2 to 3 parts of water or alcohol in inflammation of the gums, pharyngitis, nasal catarrh after the removal of nasal polypi, in the form of a spray or wash. Either form may be injected into the bladder, properly diluted, in cases of catarrhal inflammation or hæmorrhage. The topical application of hamamelis is much more decidedly hæmostatic than is explained by our present knowledge of its composition. It is a reliable agent in the treatment of capillary hæmorrhage from wounds, epistaxis, bleeding sockets after the extraction of teeth, and in bleeding piles is one of the most efficient agents at our command. This medicament, says Flagg, is very efficacious, and is particularly valuable from its constant and persistent power of inducing response; in chronic and incurable hæmorrhagic, anæmic, and inflammatory conditions, it has frequently maintained its beneficial effects for many consecutive years. Leg-ulcers, especially those occasioned by varicose veins, are remarkably benefited by the application of a lotion or ointment containing witch-hazel. This drug possesses a marked sedative as well as astringent action upon congested or inflamed tissues. Hamamelis ointment, in the

proportion of 15 to 20 grains or more of excipient, often, therefore, proves of avail in burns, erysipelas, eczema, and herpes. Excessive secretion is likewise restrained, and for this reason it is sometimes of service in seborrhœa, acne, and rosacea:—

℞ Ext. hamamelidis fld.,	f℥i–iss.
Zinci oxidi,	ℨj.
Amyli,	gr. xl.
Glycerini,	♏xxx.
Ung. aquæ rosæ,	℥j.

M. An ointment for sunburn, eczema, intertrigo, etc.

A lotion made from the fluid extract relieves the pain and stiffness of chronic rheumatism. A diluted fluid extract is an efficient lotion in carbuncle, chancroid, freckles, hyperidrosis, and lupus erythematosus. In burns and frost-bites the following combination is useful:—

℞ Liq. plumbi subacetatis,	
Tinct. opii,	āā f℥j.
Aq. hamamelidis dest.,	f℥ij.
Aquæ,	Oj.—M.

Fissures of the anus and ulcers of the anus or rectum are improved by the application of a wash or ointment containing witch-hazel.

Given by the mouth, hamamelis is scarcely less astringent and sedative than when applied externally. It renders good service in cases of acute or chronic diarrhœa, enteritis, and dysentery. It restrains suppuration in pyelitis and reduces the inflammatory congestion of cystitis. In hæmorrhage from internal organs it is an admirable remedy, and may be given with considerable confidence in bleeding from the stomach, bowels, kidneys, womb, or lungs, and in purpura hæmorrhagica. Hamamelis is useful in chronic bronchitis attended by copious discharge. It may be of service in the night-sweats of phthisis. Its internal, conjoined with its external, use is productive of excellent results in epistaxis and varicose ulcers. Varicose veins, varicocele, and internal hæmorrhoids may, not infrequently, be entirely cured by the persistent administration of hamamelis. It has been found serviceable in phlegmasia dolens and often mitigates the pain of dysmenorrhœa. The combined internal and external use of witch-hazel is useful in gonorrhœa after subsidence of the acute stage, and in leucorrhœa. Witch-hazel, also, has the reputation of preventing abortion.

HEDEOMA (U. S. P.)—Hedeoma, Pennyroyal.

Preparations.

Oleum Hedeomæ (U. S. P.).—Oil of Pennyroyal. *Dose*, ♏ii–x.

Spiritus Hedeomæ (U. S. P.).—Spirit of Hedeoma (10 per cent. of oil). External use.

Pharmacology.—The leaves and tops of Hedeoma pulegioides (Labiatæ) contain an aromatic, volatile oil, which is officinal, and is its only important constituent. It is stimulant, carminative, and emmenagogue.

Physiological Action and Therapy.—Pennyroyal-tea, or a recent infusion of the leaves and tops, is used in flatulent colic and recent suppression of the menses. The oil may be similarly employed, but is very seldom used internally except as a constituent of emmenagogue pills. Dr. Wingate has reported the case of a woman who took a teaspoonful of the oil of pennyroyal with half a teaspoonful of the fluid extract of ergot. In an hour she was unconscious, with small pulse, cold extremities, and slightly-dilated pupils. Several convulsions occurred, and opisthotonos was well marked. Morphine and atropine hypodermatically with heat externally proved restorative. Hedeoma is carminative and can be used for flatulence.

The fresh herb is said to be obnoxious to mosquitoes, and may be hung about a sleeping room, or the hands and face bathed with a recent infusion or a solution of the oil in alcohol (1 to 10), in order to keep off these midnight marauders. The spirit may be used with an atomizer or as an embrocation for the same purpose.

HELIANTHEMUM.—Helianthemum, Frostwort.

Pharmacology and Therapy.—The whole herb of the Helianthemum Canadense (Cistaceæ) is a domestic remedy as an alterative and astringent. It contains tannin and some bitter substance. A recent decoction may be used, but a fluid extract made with dilute alcohol (dose, f℥i–ij, several times a day) is a better preparation for diarrhœa and dysentery. It is also esteemed useful as a tonic in scrofula and syphilis.

HELLEBORUS.—Hellebore.

Dose, gr. iv–xv.

Pharmacology.—The black hellebore, Helleborus niger (Ranunculaceæ), an ancient remedy, is a native of Central and Southern Europe, and is cultivated in England and the United States for its showy flowers. The rhizome with rootlets is the part used. The most important constituents are two glucosides,—**Helleborin** and **Helleborein,**—both crystalline, which are cardiac and nervous poisons. There is no tannin.

Physiological Action.—The taste is bitter and acrid; the freshly bruised drug, but not the dried preparation, has a somewhat rancid odor. The dust is irritating and causes violent sneezing. Internally the effects are emetic, drastic, cathartic and emmenagogue. In its action upon the heart it resembles digitalis. Venturini and Gasparini have ascertained that solutions of helleborein, dropped into the conjunctival sac of rabbits and dogs, produce, within fifteen minutes, such complete anæsthesia

that the cornea can be penetrated without causing pain. At the same time, the sensibility of other parts of the eye and its appendages are left intact. The anæsthesia is of longer duration than that due to cocaine. No alteration of the pupil or the intra-ocular pressure is produced.*

Therapy.—Rarely used at present, except as an ingredient in some proprietary emmenagogue pills. (For American hellebore, see Veratrum Viride.)

HELONIAS.—Helonias, False Unicorn.

Dose, gr. xv.

Pharmacology and Therapy.—The Chamælirium luteum (Gray) or Helonias dioica (Pursh), belonging to the natural order, Melanthaceæ, is a native of North America, east of the Mississippi. The root is the portion used, and, from its resemblance to a horn, is called unicorn-root. It contains a bitter principle, **Chamælirin.** A fluid extract is made with the aid of alcohol, of which the dose is ♏xx–xxx. It is reported to be tonic and anthelmintic.

HEMIDESMUS.—Hemidesmus, Indian Sarsaparilla.

Pharmacology and Therapy.—The Hemidesmus Indicus (Asclepiadaceæ), as is indicated by its name, is a native of India. The root is used in the same way as sarsaparilla. It contains **Coumarin** and a little tannin. It is said to be diaphoretic, alterative, diuretic, and tonic. The fluid extract may be given in doses of f℥ss–j.

HEPATICA.—Hepatica, Liverwort.

Dose, f℥ss–iss, in fluid extract.

Pharmacology and Therapy.—The Hepatica triloba (Ranunculaceæ) is a native of North America. Its leaves contain mucilage and tannin; a recent infusion of them, taken hot, is useful in the early stage of bronchitis. The fluid extract may be employed as a demulcent astringent in diarrhœa.

HEUCHERA.—Heuchera, Alum-Root.

Dose, gr. xxx–℈ij.

Pharmacology and Therapy.—The Heuchera Americana belongs to the Saxifragaceæ, and is a native of the United States. The root contains considerable tannin (18 to 20 per cent.), and an infusion or fluid extract is useful as a mouth-wash, gargle, etc., or may be given for diarrhœa.

HIPPOCASTANUM.—Hippocastanum, Horse-Chestnut Bark.

Dose, f℥i–ij, in fluid extract.

* Medical Bulletin, January, 1890, p. 14.

Pharmacology and Therapy.—The horse-chestnut, Æsculus hippocastanum (Hippocastaneæ), is a large tree cultivated in Europe and North America as a shade-tree; its original habitat is unknown. The bark contains tannic acid and two neutral bitter principles—**Æsculin** and **Fraxin.** The effects are those of the vegetable bitters; it has some antiperiodic powers. A fluid extract, with dilute alcohol, is the best preparation.

HOANG-NAN.*

Preparations.

Extractum Hoang-Nan Fluidum.—Fluid Extract of Hoang-Nan. *Dose,* ♏v–xxx.
Tinctura Hoang-Nan.—Tincture of Hoang-Nan. *Dose,* ♏xx–xl.

Pharmacology.—Strychnos gaultheriana, hoang-nan, tropical bindweed, natural order Loganiaceæ, is an exogenous plant, native to the mountainous districts of Laos, Anam, Tonquin, and Cambodia. Its bark, which is the portion used, contains the alkaloids strychnine and brucine, the latter in larger proportion.

Physiological Action.—In small doses hoang-nan quickens and invigorates the heart, accelerates and deepens the respiration, and stimulates secretion. In moderately large doses it produces clonic, succeeded by tonic convulsions. In excessive doses it causes a rapid and considerable decline of arterial pressure, powerful tetanic spasms, and death from respiratory failure. Medicinal doses improve the appetite and digestion, augment intestinal secretion and peristalsis, and exert a stimulant or alterative influence upon the cutaneous glandular systems, both perspiratory and sebaceous, but more particularly the latter.

Therapy.—Hoang-nan is an excellent general tonic. It may be appropriately used in the treatment of chronic alcoholism. In small doses it allays nausea, relieves the tremor and prostration which follow a debauch, and sustains the heart upon the withdrawal of alcoholic drink. In anæmia, given in conjunction with iron, hoang-nan is very useful. In amenorrhœa also it is frequently of service. By improving the innervation of the muscular coat of the bronchioles it tends to diminish the frequency and severity of attacks of spasmodic asthma. This remedy is worthy of trial in tobacco amaurosis. It is of value in dyspepsia, and may be used in small doses in the vomiting of pregnancy. In convalescence from typhoid fever it is a good tonic, and is useful in neuralgia and post-paralytic tremor. It may be serviceably given in Bell's palsy, rheumatic, diphtheritic, or lead paralysis, and for reflex paraplegia. It is a useful drug in neurasthenia. In its home it is of great repute in the

* "Notes on Hoang-Nan," by the author, Therapeutic Gazette, November 15, 1889; "Notes on Hoang-Nan in Diseases of the Skin," The Journal of the American Medical Association, October 26, 1889.

treatment of leprosy, hydrophobia, snake-bite, and fevers. The claim for any decided virtue in these affections cannot, however, be maintained.

Hoang-nan is of marked efficacy in a number of skin diseases. The writer has witnessed marked improvement follow its use in seborrhœa. It has also proved valuable in alopecia. In hyperidrosis and anidrosis this agent possesses an excellent corrective influence upon the disordered secretion, and in bromidrosis it will efficiently assist the action of the local measures employed. In acne and sycosis it has manifested an excellent remedial quality. In eczema pustulosum hoang-nan will often be found very beneficial. In purpura it has sometimes been successful. Diseases attended by nervo-muscular debility and defective glandular action, such as lichen planus, lichen scrofulosus, herpes zoster, pemphigus, and ecthyma, are benefited by the administration of hoang-nan. In chronic ulcers, scrofula, and the eczema of scrofulous children, this remedy is of service. In scrofuloderma it is especially valuable. In late syphilis, or in syphilis as it occurs in broken-down individuals, hoang-nan is a valuable tonic agent. Hoang-nan may be combined as follows:—

℞ Ext. hoang-nan fld.,	f℥iss.
Acid. hydrochlorici dil.,	f℥iiss.
Tinct. gentianæ co.,	q. s. ad f℥ij.

M. Sig.: Teaspoonful in water three times a day. For dyspepsia, neurasthenia, etc.

℞ Tr. hoang-nan.,	f℥iss.
Syr. aurant.,	f℥j.
Aq. menth. pip.,	q. s. ad f℥ij.

M. Sig.: Teaspoonful three times a day. Useful in acne, seborrhœa, eczema genitalium, etc.

HOMATROPINÆ HYDROBROMAS.—Hydrobromate of Homatropine.

Dose, gr. $\frac{1}{120}$–$\frac{1}{20}$.

Pharmacology and Therapy.—Homatropine is a derivative of atropine, obtained by the decomposition of amygdalate of tropine by hydrochloric acid. It is a reliable mydriatic for examination and determination of refraction in ophthalmological practice, having the advantage over other mydriatics in being prompt in its action, but more transitory in its effects, which pass away in from thirty-six to forty-eight hours, while those of hyoscyamine last eight or nine days and those of atropine continue for ten or twelve days. The ordinary solution for paralyzing the accommodation is of the strength of 4 grains to the ounce of distilled water, a few drops of which are instilled into the eye every five or ten minutes until the full effect is obtained. Some hyperæmia of the conjunctiva generally follows its use, but not true inflammation, unless

under very exceptional circumstances. The danger of systemic infection is much less than from atropine. In the treatment of choroiditis, and other disorders for which a mydriatic is used, atropine is more suitable because its action is more prolonged, and it causes less hyperæmia.

In making homatropine solutions the distilled water should be boiled just before using, and small quantities only made at a time, as distilled water, unless recently boiled, usually contains bacteria and other germs derived from the air, which might induce irritation.

The hydrochlorate and salicylate of homatropine are salts which have a similar action to the hydrobromate, the dose of each being from $\frac{1}{120}$ to $\frac{1}{20}$ grain. Besides the mydriatic properties already referred to, these salts have likewise been used in checking night-sweats, especially of phthisis. (See also page 467.)

HUMULUS (U. S. P.).—Hops.

Preparations.

Tinctura Humuli (U. S. P.).—Tincture of Hops (20 per cent.). *Dose*, f℥i–iv.

Lupulinum (U. S. P.).—Lupuline. (The glandular powder separated from the strobiles.) *Dose*, gr. v–xx.

Extractum Lupulini Fluidum (U. S. P.).—Fluid Extract of Lupuline. *Dose*, ♏v–xv.

Oleoresina Lupulini (U. S. P.).—Oleoresin of Lupuline. *Dose*, gr. ii–v.

Infusum Humuli.—Infusion of Hops, Hop-tea (℥iv to Oj). *Dose*, f℥ii–v.

Extractum Humuli.—Extract of Hops (inspissated fluid extract). *Dose*, gr. v.

Pharmacology.—Hops are the strobiles (or fruit-cones) of Humulus lupulus (Urticaceæ). The glandular powder adhering to the axis and bracts, lupulinum, is the most important part. The constituents are a liquid alkaloid, **Lupuline,** and a bitter principle, **Lupulinic acid**; besides nearly 1 per cent. of volatile oil, 9 to 18 per cent. resin, and 3 to 4 per cent. tannin, etc. The fluid extract of lupuline is made with alcohol; the oleoresin is extracted with ether; both are eligible preparations.

Physiological Action.—The preparations of hops are stomachic, tonic, hypnotic, slightly diaphoretic, and anaphrodisiac.

Therapy.—Malt liquors, containing hops, are largely used as aids to the appetite and digestion; unfortunately, many of them contain a very small proportion of hops, the deficiency being made up with aloes or other bitter substances, with cocculus Indicus, grains of paradise, glycerin, soap, salicylic acid, etc., which detract from their value both from a medicinal and a commercial stand-point. A well-made beer of good quality, however, is a useful preparation of hops, and has considerable medicinal value as a tonic during convalescence, or in feeble digestion, or as a stimulant to the appetite and nutrition. The sedative effect of the hops is assisted by the alcohol and carbonic acid, making beer useful in gastric catarrh with gastralgia and as a hypnotic in neu-

rasthenia with insomnia. In this condition a hop-pillow is appropriately used. Though not of much efficacy in itself, yet it assists in producing a narcotic effect. Beer may be given when all other forms of nourishment are refused, as in diphtheria; and eggs, milk, or beef-powder (Mosquera beef-meal) may be added to it to increase its value. The tincture of hops, or the fluid extract of lupuline, are also alcoholic, but in them the proportion of alcohol is so considerable as to make it the chief constituent. Malt liquors increase the flow of milk during lactation.

The sedative effects of hops are obtained from a hop-poultice in local painful affections, or the hops may be placed in flannel and moistened with hot whisky and applied to painful areas, as in toothache or earache, where the warmth and steam are very soothing.

The inhalations of the vapor of hops are often attended with good results, especially in diseases of the throat and chest. Lefferts used with benefit this combination:—

℞ Sodii carbonatis exsiccati, ... gr. xx.
Aquæ ferv. (140°), ... Oj.
Solve et adde
Extracti humuli, ... ʒj.
M. The vapor to be inhaled.

In delirium tremens hop-tea, with a quantity of cayenne-pepper, quiets drink-craving and settles the stomach. In hysteria and nervousness preparations of hops are useful. Hops, especially when employed in the form of the infusion or tincture, are often most efficacious for the hypnotic action in insomnia and restlessness. The following are useful:—

℞ Tinct. humuli, ... f℥iij.
Tinct. capsici, ... fʒij.
Glycerini, ... f℥ij.
M. Sig.: A tablespoonful every hour or two. For nervousness.

℞ Tinct. humuli,
Tinct. ammon. valerianatis,
Spiritus ætheris nitrosi, ... āā f℥ij.
M. Sig.: Two teaspoonfuls in water every hour or two. Use in insomnia, hysteria, and nervousness.

In irritation of the genito-urinary passages full doses of the oleoresin of lupuline afford much relief, and it has also been used as an anaphrodisiac in priapism, chordee, spermatorrhœa, and similar affections. A very suitable prescription in genito-urinary irritation, of service in the diseases just referred to, is:—

℞ Lupulini,
Camphoræ monobromatæ, ... āā ʒj.
Ol. theobromæ, ... q. s.
M. et ft. suppositoriæ no. xij.
Sig.: Insert one up the bowel every three or four hours.

HYDRANGEA.—Hydrangea.

Preparation.

Extractum Hydrangeæ Fluidum.—Fluid Extract of Hydrangea. *Dose*, ♏xxx–f℥j.

Pharmacology and Therapy.—The root of Hydrangea arborescens (Saxifragaceæ) has long been used by the aborigines, in the South, in the form of a decoction, in the treatment of calculous affections. A fluid extract, made with diluted alcohol, is a convenient form in which to administer the remedy. It is of especial utility in gravel and renal colic.

HYDRARGYRUM (U. S. P.).—Mercury, Quicksilver.

Preparations and Salts.

Hydrargyrum cum Cretâ (U. S. P.).—Mercury with Chalk, Gray Powder (mercury 38, milk-sugar 12, prepared chalk 50 parts). *Dose*, gr. ss–x.

Massa Hydrargyri (U. S. P.).—Mass of Mercury, Blue Mass, Blue Pill (mercury, 33 per cent., with althea, liquorice, glycerin, and honey; a 3-grain blue pill contains 1 grain of mercury). *Dose*, gr. ss–xij.

Unguentum Hydrargyri (U. S. P.).—Mercurial or Blue Ointment (mercury, 50 per cent., triturated with lard, salt, compound tincture of benzoin, and some old mercurial ointment).

Emplastrum Hydrargyri (U. S. P.).—Mercurial Plaster (mercury, 30 parts; lead plaster, 50 parts; olive-oil and resin, each 10 parts).

Emplastrum Ammoniaci cum Hydrargyro (U. S. P.).—Plaster of Ammoniac and Mercury (contains mercury 18, and ammoniac 72 parts). (See page 431.)

Hydrargyri Oxidum Rubrum (U. S. P.).—Red Oxide of Mercury. *Dose*, gr. $\frac{1}{50}$–$\frac{1}{10}$.

Unguentum Hydrargyri Oxidi Rubri (U. S. P.).—Ointment of the Red Oxide of Mercury (10 per cent.).

Hydrargyri Oxidum Flavum (U. S. P.)—Yellow Oxide of Mercury. For external use.

Unguentum Hydrargyri Oxidi Flavi (U. S. P.).—Ointment of the Yellow Oxide of Mercury (10 per cent.).

Oleatum Hydrargyri (U. S. P.).—Oleate of Mercury (yellow oxide, 10 per cent.; oleic acid, 90).

Hydrargyri Chloridum Mite (U. S. P.).—Mild Chloride of Mercury, Calomel, Mercurous Chloride. *Dose*, gr. $\frac{1}{20}$–x.

Hydrargyri Chloridum Corrosivum (U. S. P.).—Corrosive Chloride of Mercury, Corrosive Sublimate, Mercuric Chloride. *Dose*, gr. $\frac{1}{30}$–$\frac{1}{10}$.

Hydrargyrum Ammoniatum (U. S. P.).—Ammoniated Mercury, White Precipitate. For external use.

Unguentum Hydrargyri Ammoniati (U. S. P.).—Ointment of White Precipitate (ammoniated mercury 10, benzoinated lard 90 parts).

Hydrargyri Iodidum Viride (U. S. P.).—Green Iodide of Mercury, Protiodide. *Dose*, gr. $\frac{1}{3}$.

Hydrargyri Iodidum Rubrum (U. S. P.).—Red Iodide of Mercury, Biniodide, Mercuric Iodide. *Dose*, gr. $\frac{1}{50}$–$\frac{1}{10}$.

Liquor Arsenii et Hydrargyri Iodidi (U. S. P.).—Donovan's Solution (1 per cent. each iodide of arsenic and biniodide of mercury). *Dose*, ♏i–x.

Liquor Hydrargyri Nitratis (U. S. P.).—Solution of Nitrate of Mercury, Acid Nitrate (contains 50 per cent. of mercuric nitrate). A powerful caustic.

Unguentum Hydrargyri Nitratis (U. S. P.).—Ointment of Nitrate of Mercury, Citrine Ointment (mercury 7, nitric acid 17, lard 76 parts).

Hydrargyri Subsulphas Flavus (U. S. P.).—Yellow Subsulphate of Mercury. *Dose*, gr. ii–v, as an emetic for children.

Hydrargyri Sulphidum Rubrum (U. S. P.).—Red Sulphide of Mercury, Cinnabar. Used only in pharmacy and for fumigation.

Hydrargyri Salicylas.—Salicylate of Mercury (mercurous salicylate, dose, gr. $\frac{1}{8}$–$\frac{1}{4}$; mercuric salicylate, dose, $\frac{1}{12}$–$\frac{1}{8}$).

Hydrargyri Cyanidum (U. S. P.).—Cyanide of Mercury. *Dose*, gr. $\frac{1}{100}$–$\frac{1}{32}$.

Hydrargyri Formamidatum.—Formamide of Mercury. For hypodermatic use. *Dose*, gr. $\frac{1}{6}$.

Hydrargyri Tannas.—Tannate of Mercury (mercurous tannate). *Dose*, gr. ss–j.

Lotio Flava.—Yellow Wash (corrosive sublimate, gr. xxiv, in lime-water, f℥xvj). For external use.

Lotio Nigra.—Black Wash (calomel, gr. lxiv, in lime-water, f℥xvj).

Triturations can be made with any mercurial and sugar of milk, usually in decimal proportions.

Pharmacology.—Commercial mercury is always impure, being combined with tin, antimony, zinc, and other metals. It can be purified by treating it with dilute nitric acid, and afterward washing it free from the acid with water. In the pure state, it is a shining, silver-white metal, liquid at common temperatures, and having the specific gravity of 13.5. The chlorides are the salts of the greatest medical importance. They are made by double decomposition; thus, sulphate of mercury and chloride of sodium are triturated together and heat applied, when the mercuric (or corrosive) chloride sublimes in the form of white crystalline masses or powder; in order to form the mercurous chloride (calomel), an additional proportion of mercuric sulphate is added before subliming. Owing to the tendency to combine with other metals, the presence of mercury may be ascertained by half immersing a gold piece in a suspected solution, when the mercury will be deposited as a gray or silver coating, if present. Reinsch's test and the reduction test may be employed as in testing for arsenic, when the small globules of mercury may be detected upon the glass, which are as easily recognized with the microscope as the crystals of arsenic.

In accordance with the chemical theory of Mialhe, it is usually taught that calomel is converted within the body into corrosive sublimate by the agency of sodium chloride. As a result of careful experiments, Dr. Paul Adams finds that, although this change may take place in the air, the access of air is practically excluded from the alimentary tract and that but a trace of calomel passes into solution. This is the case even in the presence of organic matter, and he arrives at the conclusion that sodium chloride is not incompatible with calomel. For the same reason it had generally been held that muriatic or nitro-muriatic acid should not be given in conjunction with the mild chloride.

Physiological Action and Antidotes.—The salts of mercury are very poisonous to all lower forms of life, and mercurial solutions form our most convenient and useful antiseptics. Applied to the skin, in concen-

trated form, most of them are irritating, and some are destructive, to the tissues. They easily diffuse through the integument, and may in this way cause systemic effects, even from the solutions employed for antiseptic purposes, but especially from inunctions with mercurial ointment or fumigations. When taken into the blood, mercury, in very minute doses, increases the number of red blood-corpuscles, especially in conditions of cachexia or anæmia. This has been called the tonic action, and is obtained from doses of a hundredth of a grain or less of the corrosive chloride three times a day. In larger doses the salt is a cardiac poison, lowering its action and destroying the red blood-corpuscles and reducing the fibrin. At the same time mercury has a marked influence upon the nervous system, causing debility with tremors; it also affects the digestive organs, causing diarrhœa, more or less salivation, and a fetid breath; if continued a sufficient length of time emaciation also occurs. These symptoms, taken collectively, constitute **Hydrargism,** or **Mercurial Cachexia,** or **Erethism,** which might be mistaken for malignant disease, especially if accompanied by some enlargement of the liver. Pure metallic mercury is not poisonous, and passes through the alimentary tract unchanged, acting as a mechanical laxative. Acute poisoning by corrosive sublimate occurs when a toxic dose has been swallowed. The symptoms are immediate and violent: these are vomiting; purging, at first serous, afterward bloody; burning pain in the stomach and œsophagus, suppression of urine, face swollen and bloated, with much prostration of the bodily powers, etc.

Albumin is the antidote to corrosive sublimate; eggs and milk should be freely swallowed, the stomach washed out with a stomach-pump, arterial stimulants administered, hypodermatic injections of morphine and whisky given, and external heat applied. After the first symptoms are over, the patient is liable to perish from ulceration or stricture of the œsophagus, destruction of the peptic glands in the stomach, salivation, and exhaustion.

The action of mercury upon the liver has occasioned much controversy, and is not yet satisfactorily settled. It is believed that the corrosive chloride in small doses is a hepatic stimulant and cholagogue; but this action is denied to calomel, which directs its action principally to the excretory glands in the lower part of the small intestine and colon. It is not yet known, however, in what form calomel enters the blood, but it is possible that a soluble combination is formed with albumin and hydrochloric acid; it is even possible that part of it may be changed into corrosive chloride, in which case some action upon the liver would naturally follow. Whatever ingenious explanation the laboratory may have to offer with regard to the cholagogue action of the mercurials, and calomel

especially, clinical medicine has already settled the fact that where the tongue is heavily coated and the conjunctivæ slightly jaundiced, the skin sallow, and the liver inactive, with clay-colored stools, it can all be set right with a few small doses of calomel, and bilious stools be produced.

The diuretic action of mercury has of late years attracted considerable attention. It has been found that mercury, and more especially calomel and blue-pill, have the power of decidedly promoting the action of diuretics. Boem (*British Medical Journal*) claims that the absorption of mercury salicylate, which is incomplete, is, however, greater than that of calomel. It is stated, as the result of some recent investigations by F. Klemperer,* that, in rabbits, corrosive sublimate injected into the blood was eliminated by the intestinal glands and kidneys. In acute cases there was congestion of the kidneys, with extravasations, and, if prolonged, the parenchyma showed signs of inflammation, with a deposit of chalk in the straight tubules; while, in the dog, there occurred fatty degeneration instead of chalky deposit. It is evident that mercury in small doses is capable of acting as a stimulant to the kidneys, and this agrees with the observations of Jendrassik upon the use of calomel as a diuretic. Mercurials, therefore, are useful additions to squill, digitalis, and other diuretic remedies.

Upon the salivary glands, mercurials have very stimulating effects. The salivary secretions may be increased to several pints daily, the fluid at first being albuminous and thick, but subsequently becoming thin and watery. The irritation may cause inflammation, and ulceration or sloughing of the mouth or cheek may result, especially where the patient is in poor physical condition or suffers with some cachexia, or is exceptionally susceptible to the action of mercury. The condition of the general system accompanying the action of the mercurial upon the salivary glands and mouth is known as "ptyalism," or salivation. It is best treated by mouth-washes containing chlorate of potash and tincture of myrrh, and by tonics and small doses of belladonna, or atropine with morphine. The gums may become inflamed, soft, and bleeding, and the teeth loose, but under this treatment the inflammation subsides and the teeth again become firm. Salivation was of such common occurrence when mercury was given freely that it was looked upon as salutary, and it was thought necessary to "touch the gums" in order to obtain therapeutic results from the remedy; but this idea no longer prevails, and patients are no longer salivated intentionally, and this part of the so-called antiphlogistic treatment has fallen into disuse.

Therapy.—The most common local application of mercurials at present is in antiseptic surgery. The solutions have the advantage

* Therapeutic Gazette, October 15, 1890, p. 693.

of convenience, being easily made and cheap, odorless and permanent. The field of operation, having been well soaped and shaved and washed with ether, is usually irrigated with a solution of corrosive sublimate (1 to 2000, or stronger if the skin is unbroken). For washing out wound-cavities, or the peritoneum, much weaker solutions should be made use of (1 to 6000 or 10,000), or simply freshly-boiled warm water employed for a douche. In lying-in hospitals, or where the surroundings are decidedly unhygienic, and also where symptoms of septic infection are manifested after delivery, the danger may be averted by the free use of antiseptic vaginal douches several times a day. An extract* will show the value of corrosive sublimate in combination with an acid as an antiseptic as follows :—

"In 1880, Koch demonstrated that bichloride of mercury (sublimate) was the most powerful of antiseptics. It was found that in a solution of 1 to 1000 it would soon destroy the spores of anthrax, the most virulent of all germs. This was true with regard to non-albuminous media, but when the medium to be disinfected contained albumin the mercury coagulated the albumin, formed an albuminate of mercury, which deposited, leaving the supernatant liquid practically free from mercury, and, hence, without antiseptic power. Dr. Ernest Laplace, in Koch's laboratory, seeking a method to prevent this coagulation, and, therefore, to retain for the mercury its same disinfecting power in albuminous as in non-albuminous fluids, found that an addition of a small quantity of any acid to the ordinary solution would fulfill this purpose. Accordingly, the acid sublimate solution consists of—

Sublimate, ...	1 part.
Hydrochloric acid (pure), ...	5 parts.
Water, ... q. s. ad	1000 "

"Hydrochloric acid is used preferably to all others. When, however, the acid sublimate must be carried in a solid form, tartaric acid is substituted for the hydrochloric acid.

Sublimate, ...	1 part.
Tartaric acid, ...	5 parts.

To be made into a tablet, which must be dissolved in 1000 parts of water.

"This form was adopted by the Academy of Medicine of Paris, to be used by midwives throughout France. The acid sublimate is the only disinfectant used in Koch's laboratory. It is also used in the Pasteur Institute of Paris. Besides being the surest and most powerful antiseptic, it is the only solution of mercury that will always retain its integrity, and never form a deposit of earthy salts.

* Laplace, Deutsche Med. Woch., No. 40, 1887.

"It is used for all manner of disinfection, except that of instruments. In a solution as weak as 1 to 50,000 it retains sufficient power to destroy the germs of suppuration."

Bernardy prefers as an antiseptic the biniodide (1 to 4000 or 1 in 20,000) to the sublimate solutions, as recommended by Miquel,* and which Panas prefers in eye surgery, it being less irritating than corrosive sublimate. It might also be added that there is much less danger of a mercurial impression being made upon the system by absorption where this salt is used, as the solutions usually only contain half as much mercurial.

Mercury may be applied to the skin with a view to absorption, and for this purpose the ointment or the oleate may be used, a piece the size of a marble or larger being rubbed upon the inner side of the arms and thighs once or twice daily. The place of inunction must be changed, as the mercury causes some local irritation, and a crop of papules is likely to follow its repeated application to the same spot. (A case of eruption all over the body, resembling variola from mercurial application, is reported in *Deutsch. Med. Zeitung*, January 2, 1890.) A small piece of ointment may be rubbed upon the soles of the feet before putting on the stockings each morning, the friction in the act of walking being sufficient to cause absorption. In the case of infants suffering with congenital or acquired syphilis, the ointment may be rubbed upon the abdomen under the belly-band. This method is resorted to when it is desired to impress the system rapidly, as, for instance, in the treatment of the inflammatory manifestations of syphilis, especially in iritis. The constitutional effect can be most rapidly obtained in this way without disturbing the digestive organs. In syphilis, especially when the infiltration is marked upon the skin, the efficacy of one of the mercurial ointments may be increased by combining with some stimulating oil or green soap :—

℞ Ungt. hydrargyri nitratis,
Sapo viridis, ... āā ℥iss.
Ol. eucalypti, ... fℨss.—M.

℞ Ungt. hydrargyri ammoniat., ... ℥ij.
Olei anthemidis, ... fℨss.—M.

℞ Ungt. hydrargyri oleatis (10 vel 20 per cent.), ... ℥ij.
Olei cadini, ... fℨij.—M.

℞ Ungt. hydrargyri oleatis (10 per cent.), ... ℥j.
Olei carophylli, ... ♏xx.—M.

Often the most rapid way to mercurialize a patient is by using the drug in the form of suppositories. Fumigation is also a method of introducing mercury into the blood by way of the skin. The usual

* Philadelphia Medical Times, vol. xvi, p. 521.

method is to place the patient in a vapor-bath until he is perspiring freely, and then to expose the body to the fumes arising from 10 or 20 grains of calomel sublimated by the flame of an alcohol-lamp. The fumes should not be inhaled, and, therefore, the patient, sitting on a chair, has a blanket or his clothing fastened around his neck and extending down to the floor all around, making a canopy; under the chair is placed a small spirit-lamp, and over it, upon a sheet of tin, is placed the mercurial. The patient, after about fifteen minutes' exposure, is wrapped up in dry, warm blankets, and the skin allowed to dry spontaneously. If perspiration continue it may require a small dose of atropine. In this way the mercury is deposited upon the skin, and is gradually absorbed, producing the greatest impression with the least disturbance. This method is especially valuable in controlling the skin disorders attending syphilis (syphilides), and in the treatment of other manifestations of the poison when mercury is not well borne by the bowels. The hypodermatic method of administering mercurials has been practiced of late years in Germany and, to a limited extent, in this country. For this purpose solutions of corrosive chloride (hydrarg. chlor. cor., gr. j; aquæ destillatæ, f℥ij. Sig.: Ten minims a dose once a day) have been increased, minim by minim, until 50 or more are administered, or until the physiological action of the mercury is apparent. This plan of treatment is as cleanly, quick in results, and more successful, than any other in preventing relapses.

It may, however, cause irritation, and has, in some rare instances, when given improperly, led to abscess and sloughing. If the hypodermatic needle be properly inserted, the instrument and needle aseptic, the author has never observed any case of abscess follow the hypodermatic injection of the corrosive chloride of mercury. The moment the least mercurial impression is made by the subcutaneous injection, the dose should be reduced to the smallest amount. A few minims of the solution already named should be again injected into the muscle or skin, and the system kept under the impression of the drug by injections every day or two, until all evidence of syphilis disappears. In place of using small doses of mercury every day hypodermatically, the writer sometimes, especially in lean subjects, injects from $\frac{1}{4}$ to $\frac{1}{3}$ grain of corrosive sublimate two or three times a week into the muscular tissue of the gluteal region or back. The hypodermatic method thus administered is for old cases of syphilis, especially in broken-down individuals, and offers a most positive way of limiting or curing the disease.

The albuminate and peptonate of mercury have been proposed with a view to obviate any accidents, but with little improvement. In the clinic of the late Auspitz the following solution was employed:—

℞ Hydrarg. chlor. corrosiv., ... gr. xv.
Sodii chloridi, ... gr. xxx.
Aquæ destillatæ, ... f℥iij.

M. Dose, ♏x–xx every second day hypodermatically.

Mathes states that no irritation results beyond a little tumefaction. About twenty or thirty injections constituted the course of treatment, which resulted in a cure. Liebreich recommends the formamide of mercury, which does not coagulate albumin, is neutral in reaction, readily combines with water, and is not precipitated by alkalies.

Formamide of Mercury* is prepared as follows: 10 to 13 grammes of freshly precipitated, completely washed, and still moist mercuric oxide are gently warmed with a little water in a porcelain capsule, with a gradual addition of 10 grammes of formamide (resulting from the reaction of ammonia upon formate of ethyl). As soon as solution has taken place the resulting colorless liquid is filtered into a litre-flask, and the latter filled to the litre-mark with distilled water. Each cubic centimetre contains 0.01 gramme of mercury (gr. $\frac{1}{6}$), which is one hypodermatic dose. It should be dispensed in brown-colored bottles. Zeissel, of Vienna, after trial of this agent, was well satisfied with it, and found twenty injections the maximum number required to disperse the syphilitic manifestations, even in severe cases. Kopp's† conclusions from over 3000 injections were less favorable; he says that "Liebreich's preparation is decidedly useful in certain of the milder forms of primary syphilis, as also for slight secondaries. The formamide should not be employed in severe cases where there are large papules or thick infiltrations; inunction is still the best method of treating these cases. The tertiary forms are likewise not to be treated by the formamide. Relapses are by no means prevented by Liebreich's method; on the contrary, they appear to be extraordinarily common after this treatment." In order to obtain more permanent effects than are possible by the use of the soluble preparations, it has been thought that by depositing the more stable compounds under the skin a more lasting effect can be obtained, and calomel is now used in this manner. The calomel may be suspended in liquid vaselin or olive-oil (1 in 10). There should be at least a week's interval between the injections, which are usually thrown deeply into the tissues of the buttocks or retro-trochanteric space (Besnier). The part should be washed with antiseptic solution, and the needle sterilized before each operation; the puncture should be immediately covered with emplastrum de Vigo or by a drop of collodion.‡ It should be pointed out that the subcu-

* "Notes on Hydrargyrum Formamidatum," by J. C. Wilson, M.D., Philadelphia Medical Times, vol. xiv, p. 149.

† Vierteljahrschrift für Dermatologie und Syphilis, 1885.

‡ Revue Gén. de Clinique et de Thérapeutique, September 12, 1889.

taneous injection of calomel, or other insoluble preparation of mercury, is not without danger. There is liability to the local deposit of the mineral at the point of injection, with continuous slow absorption. Embolic pulmonary infarction has occurred in direct consequence of the procedure, while in other cases a dysenteric condition was established.

In France, the blue ointment (made with oil instead of fat) is used, but it has occasioned abscess and repeated attacks of stomatitis. The benzoate of mercury, proposed by Stukovenkoff, has been adopted by some of the French physicians as the material for injection; 3 grains of the salt with $\frac{3}{4}$ grain of chloride of sodium are added to 1 ounce of water, and of this solution about 6 milligrammes ($\frac{1}{12}$ grain) are injected daily into the buttock. Urethral injections (1 to 5000 or 1 to 10,000) of the benzoate have likewise been successfully employed in gonorrhœa.

Other mercurial preparations have been used in the same manner for the same purpose. Gray oil is much in vogue in Vienna, while the salicylate, yellow iodide, and cyanide have been experimentally employed by Roussel and Chernoguboff. Gray oil consists of mercury, lanolin, and olive-oil. A case has lately been reported in which a 30-per-cent. solution (hydrarg., lanolin., āā 3 parts; olei olivæ, 4 parts) had been used during seven weeks as a subcutaneous injection. At the date of the last injection no sign of mercurialism was present, but a week later the gums became tender, ptyalism and violent gastro-enteritis soon ensued, and in about a month the patient died.

The writer has employed the mercurials, especially the corrosive chloride, hypodermatically in the treatment of several cases of psoriasis, with a complete removal of all the eruption from the body, the dose and injection used being similar to that already described in treating syphilis. Poncel,* of the Marseilles Hospital, has also employed injections of the corrosive chloride of mercury into tumors of a cancerous appearance, followed by their complete disappearance.

Mercurials are used for their local effects upon mucous membranes; for instance, in syphilitic ulceration of the tongue, lozenges of liquorice containing $\frac{1}{20}$ grain corrosive sublimate may be allowed to slowly dissolve in the mouth, and the solution being swallowed also produces its constitutional effects. In diseases of the uterus and pelvic organs, Dr. L. Smith, of Montreal, uses cotton and wool tampons containing mercuric chloride, $\frac{1}{10}$ grain, in conjunction with boro-glyceride solution (10 per cent.), introduced into the vagina twice a week. These may be left in place from four days to a week without decomposing or causing irritation. They take the place of pessaries, are cleanly, convenient, and efficient in the treatment of vaginitis, endometritis, salpingitis, ovaritis,

* Medical Press and Circular, September 17, 1890.

and pelvic peritonitis, and they entirely remove any unpleasant odor from the discharges.*

In ear affections an ointment of the yellow oxide of mercury, 5 to 10 grains to the ounce of lard or cold cream, is much used to relieve inflammation and keep the canal clean. A similar ointment has been used in eye practice in the treatment of chronic blepharitis, tinea tarsi, and eczema, or by rubbing in at night a little diluted citrine ointment. The irritant properties of the red oxide render its ointment a useful application to indolent ulcers, whether of syphilitic or common origin; to enlarged scrofulous glands, or goitre, rosacea, scleroderma, and lepra. The oleate is a milder and a safer application, though less efficient. The yellow wash is a good application in scrofulous conjunctivitis. Finely-powdered calomel may be dusted over the surface of the lids in phlyctenular ophthalmia and corneal ulcerations. The ointment of the red oxide is a valuable counter-irritant and resolvent in enlarged glands, goitre, and ague-cake, the application being made in the direct rays of the sun or before a fire. This ointment may also be serviceably applied to indolent ulcers, seborrhœa, and lupus erythematosus. Ulcers, especially venereal, are stimulated by the application of dilute acid nitrate of mercury (1 to 10 or 20), but this preparation often gives rise to pain and hæmorrhage, and should be used very cautiously upon soft parts for fear of causing sloughing. It should never be used for venereal ulcers in full strength. A better method is to wash the sores or condylomata with solution of chlorinated soda, and, after drying with absorbent cotton, dust calomel, or equal parts of calomel and starch, over the surface, as practiced by Ricord. The black wash also makes a good dressing in such cases and in rhus poisoning. In acne or eczema of the scalp, lotions containing 1 or 2 grains of corrosive sublimate to each ounce are much used. Calomel alone or combined thus is of service in herpes and irritation around the genital organs:—

℞ Hydrargyri chloridi mitis, ... ʒiij.
Bismuth. subnit.,
Pulv. lycopodii, ... āā ℥ss.
M. Sig.: Dust over the surface.

Calomel is also of much value, dusted over the surface, to diminish exuberant granulations, as follows:—

℞ Hydrargyri chloridi mitis, ... ℥ss.
Iodoformi vel iodoli, ... ℥ss.
M. Sig.: Sprinkle over the ulcer or ulcerated surface.

Calomel likewise forms an ingredient of many cancer powders for

* Canada Medical Record, October, 1898.

destroying malignant growths upon and in the skin. Esmarch's painless powder contains calomel, and is composed as follows :—

℞ Hydrargyri chloridi mitis, ... gr. lxxx.
Acidi arseniosi,
Morphinæ hydrochloratis, ... āā gr. x.
Pulveris acaciæ, ... ℥j.—M.

For acne we may use the following :—

℞ Hydrarg. chloridi corrosiv., ... gr. vj.
Mist. amygdalæ, ... f℥vj.

M. Sig. : Apply night and morning.

Stronger solutions are useful in scabies, tinea versicolor, ringworm, and alopecia :—

℞ Hydrargyri chloridi corrosivi, ... gr. xij.
Spiritus thymoli, ... fʒij.
Aquæ hamamelidis dest., ... f℥v.—M.

℞ Hydrargyri chloridi corrosivi, ... gr. x.
Spiritus rosmarini, ... f℥j.
Ammonii chloridi, ... ʒss.
Spiritus vini rectificat., ... f℥iv.—M.

The ointment of the nitrate, diluted, or the mercurial ointment, have long been used upon the face in small-pox in order to prevent the development of the pocks and consequent pitting. Whether the effect is dependent upon the mercury or exclusion of light and air still remain undecided. A weakened citrine ointment is valuable in the topical management of ozæna. In the varieties of trichophytosis and in phtheiriasis the ointment of the nitrate of mercury is valuable. It is beneficial, moreover, in chronic eczema, psoriasis, rosacea, sycosis, and in numerous chronic disorders of the skin.

An ointment of calomel, 20 grains to 1 ounce of lard, is also serviceable in similar cases, and Ringer considers it of special service in itching affections, especially around the anus. A weak calomel ointment, 5 or 10 grains to the ounce, is of service in impetigo contagiosa and ecthyma after separation of the crusts. The later stage of dermatitis is benefited by the use of this unguent.

The following formulæ, containing one of the mercurial ointments, may be employed in the diseases referred to above :—

℞ Ungt. hydrargyri ammoniat., ... ℥ss.
Olei lavandulæ, ... ♏xx.
Ungt. zinci oleatis, ... ℥ss.

M. Use in acne, rosacea, and chronic eczema.

℞ Ungt. hydrargyri nitratis, ... ℥ss.
Olei juniperi, ... fʒss vel ʒij.
Lanolini, ... ℥ss.

M. For chronic psoriasis and eczema, especially of the hands and feet.

℞ Ungt. hydrargyri oleatis (20 per cent.),		℥j.
Aristol.,		ʒj.

M. Serviceable in animal and vegetable parasitic diseases.

℞ Ungt. hydrargyri ammoniat.,		℥j.
Mentholi,		
Cocainæ,	āā	gr. x.
Ol. caryophylli,		♏x.

M. Beneficial in herpes, herpes zoster, seborrhœa, and eczema, especially of the genital organs.

℞ Hydrargyri oxidi flav.,		gr. vj.
Camphoræ,		gr. iij.
Ungt. aquæ rosæ,		
Lanolini,	āā	ʒij.

M. For irritable and inflamed eyelids.

Flagg recommends the red oxide of mercury combined as follows:—

℞ Hydrargyri oxidi rub.,	ʒiij.
Ceratum benzoati,	℥j.—M.

This preparation maintains its integrity, he adds, for many months and sometimes for years.

Its use in dental practice, says Flagg, is for the anointing of chapped lips, the treatment of sores and cracks at mouth-corners, and for the cure of fissured lips. By distending the fissures and filling them repeatedly with the ointment—*distending the fissure* with each insertion of ointment—a quality of cicatricial tissue is produced which, by its toughening, almost always prevents any subsequent fissuring.

The late Dr. Marshall employed a 5-per-cent. solution of the oleate in oleic acid, adding one-eighth part of ether, for sycosis and parasitic and itching affections. The oleates are useful where induration exists. The ointment of mercurous oleate is preferable to blue ointment in the inunction treatment of syphilis, being more elegant and cleanly, and equally efficient. This preparation is of decided value in old patches of psoriasis and chronic eczema of the palms or soles. The mercuric oleate exerts a powerful resolvent influence upon enlarged glands and upon a thickened, indurated condition of the integument. It is, likewise, curative in animal and vegetable parasitic affections.

In troublesome ulcerations of the throat, corrosive-sublimate solution is often beneficial as a local application, accompanied by other treatment suitable to the case. In diphtheria the best results are obtained by the internal administration of mercurials, conjoined with local disinfection by salt-water douche, permanganate of potassium, trypsin, Monsel's solution, or boro-glyceride, instead of local applications of mercurials, since where they are frequently used it is impossible to estimate how much has been swallowed. In ozæna, white precipitate may be used in

the form of a snuff with white sugar, or with gum acacia and subnitrate of bismuth in the strength of 4 to 8 grains to each ounce.

In chronic gonorrhœa or urethritis, irrigation of the urethra with weak solutions of corrosive sublimate (gr. i–f℥xij), used every four hours, is sometimes followed by rapid cure. A little tartaric acid should be added to the solution to keep the mercury from becoming changed into an albuminate. In gonorrhœa and gleet injection of a solution of salicylate of mercury, 1 to 4 grains to the ounce, may rapidly remove the discharge.

In affections of the joints, orchitis, enlarged glands, an ointment containing 1 or 2 grains of morphine and a drachm of calomel in each ounce is very useful in reducing the swelling and averting threatened abscess. By the use of the Vigo plaster, compression may be made around a joint or a swollen testicle with great benefit; 2 or 3 grains of corrosive sublimate incorporated in an ounce of ointment is sometimes found of service in acne, and from 2 to 5 grains to the ounce is an effective application to freckles. An ointment of the latter strength is also useful in the ulcerated stage of lupus vulgaris. The officinal blue ointment is useful in erysipelas as a local application, allays inflammation in paronychia, and is a good dressing in chilblains and dermatitis. The solution of the nitrate of mercury is serviceably applied to warts, chancroids, syphilitic condylomata, mucous patches, and ulcers of the mouth. The ointment of ammoniated mercury is valuable as a stimulant and resolvent.

Since fermentation is now known to play an important part in disorders of digestion, it is to be expected that the antiseptic powers of mercury would make it conspicuously useful in treating digestive disorders. When there is a foul stomach, coated tongue, some vertigo or headache, constipation, and depression of spirits,—what is commonly called a bilious attack,—10 or 12 grains of blue mass or calomel, followed in from six to eight hours by a saline purgative, will entirely change the state of affairs. It is probably true that these doses are larger than necessary, but, as the excess is carried away by the saline, no harm is done. In some cases much smaller quantities given in broken doses, say $\frac{1}{10}$ grain of calomel with a little soda, given each hour until 5 doses are taken, is sufficient to produce the same effect if followed by a cathartic. If there is much engorgement of the liver, larger doses are preferable, and we may use with advantage the old "ten and ten" (10 grains of calomel and 10 of jalap). During the first week of typhoid fever, 2 or 3 full doses of calomel are useful in cleaning the alimentary canal and making it to some degree aseptic. This is a part of the so-called specific treatment of typhoid. In infancy, digestive disorders are very common and they are promptly controlled by mercurials. Mercury with chalk is

a common ingredient in teething-powders, but should not be used freely unless the infant suffers with congenital syphilis; for, although children are not easily salivated, yet they may be affected by the mercurial, as is shown by the peculiarity in the shape of the permanent teeth due to malformation, the result of the incautious use of teething powders containing mercury. Calomel is used for the same purpose, as well as the corrosive chloride, both of which are particularly useful in Asiatic cholera and mucous diarrhœa or enterocolitis, in small or minute doses given every hour, dissolved in recently-boiled water. In strumous children, with poor digestion and small appetite and irregular bowels, the following is a valuable tonic:—

℞ Hydrarg. chlor. corrosiv.,	gr. j.
Tr. gentianæ,	f℥v.
Syr. aurantii,	f℥j.

M. Sig.: A teaspoonful four times daily, at meal-times.

In vomiting of adults and infants, $\frac{1}{100}$ grain of corrosive sublimate, or minute doses of calomel with soda or saccharated pepsin, will often check the irritability of the stomach if the diet is properly restricted. In infants having vomiting it may be necessary to stop the use of milk for a few days, and rely altogether upon rice-water or albumin-water until the digestion is normal again. The vomiting of cholera infantum is often relieved by small doses of calomel, and the nausea of adults frequently yields to the same treatment. A minute dose of calomel or corrosive sublimate, administered at hourly intervals, is advantageous in acute or chronic dysentery, soon causing the disappearance of blood and mucus from the discharges. The corrosive chloride, in doses of $\frac{1}{60}$ to $\frac{1}{30}$ grain before each meal, promotes cicatrization of a gastric ulcer. The occasional use of a mercurial purge aids in expelling intestinal worms, and, in fact, calomel is an efficient remedy against tape-worm. Given in full cathartic dose, mercury also is an excellent anthelmintic in case of lumbricoid worms. It is a common and good practice to use a mercurial in combination with santonin.

Mercury is no longer regarded as essential in the treatment of all forms of inflammation of internal organs, but small doses are valuable in promoting the absorption of inflammatory exudations, especially in glandular affections, in orchitis, in croupous pneumonia or broncho-pneumonia, tonsillitis and meningitis. The same mode of treatment is efficacious in acute pleurisy, peri- or endo- carditis in previously robust patients. In dropsy due to deficient excretion, calomel, 1 grain three times daily, with squill or digitalis, will cause a free diuresis in a few days, but should not be pushed too far on account of the danger of sali-

vation in a depressed subject. It is in dropsy dependent upon disease of the heart that the diuretic action of calomel is especially advantageous.

In the treatment of diphtheria, Dr. Daly,* of Pittsburgh, strongly advocates Reiter's method of using calomel; 2 to 5 grains being given every hour, or every two or three hours, to young children, until the discharges from the bowels appear as colorless serum, with a little greenish mucus or bile upon the surface resembling chopped spinach. Then the interval is lengthened, but the same dose continued. Shorts† gives from 5 to 15 grains every two or three hours to an adult until the greenish stools are obtained, avoiding salivation by the simultaneous administration of 5 to 8 grains of chlorate of potassium. The bichloride of mercury has also its advocates in this disease, and here the system tolerates comparatively large doses not only with impunity but with benefit. From $\frac{1}{40}$ to $\frac{1}{10}$ grain may be given every two hours to an infant for twenty-four to forty-eight hours, until the worst part of the illness has passed over, when the intervals can be lengthened and the dose reduced. This has the advantage of being less likely to cause salivation than the calomel. In true membranous or diphtheritic croup this plan of treatment may avert the necessity of intubation or tracheotomy. In diphtheria, Dr. E. L. B. Godfrey uses iron in combination with corrosive chloride of mercury :—

℞ Hydrargyri chloridi corrosivi,	. . . .	gr. j.
Tinct. ferri chloridi,	. . . .	f℥ij.
Syrup. simplicis,	. . . .	f℥vj.
Aquæ,	. . . . q. s. ad	f℥iij.

M. Sig.: A teaspoonful in water every three hours.

The yellow sulphate of mercury is a valuable adjunct in the treatment, for 2 or 3 grains administered to a child are followed by prompt emesis and the ejection of false membrane from the throat. Fordyce Barker considers it uniformly successful in croup. It should not be allowed to remain in the stomach in case the first dose does not produce vomiting, as it may cause gastritis or mercurial poisoning; it generally is rejected too rapidly for absorption to take place.

In other constitutional diseases attended by inflammation of the throat we may give $\frac{1}{3}$ grain of gray powder three or four times a day, as recommended by Ringer. This high authority also advises the same preparation in the same dose, given hourly, in acute tonsillitis when the swollen glands interfere with deglutition and respiration.

The appended formulæ containing mercury will be of benefit in diphtheria, acute tonsillitis, and often in acute laryngitis :—

* Transactions of American Laryngological Association, 1886.

† Physician and Surgeon, September, 1889; Annual of Universal Medical Sciences, 1890.

℞ Hydrargyri chloridi mitis,	gr. ij.
Antimonii et potassii tart.,	gr. j.
Sacchari albi,	ʒss.

M. et ft. chartæ no. x.
Sig.: A powder every hour or two.

℞ Hydrargyri chloridi corrosivi,	gr. j.
Tinct. guaiaci,	f℥j.
Glycerini,	f℥ij.

M. Sig.: A half to a teaspoonful every two or three hours.

The sore throat of scarlatina is benefited by the administration of the gray powder, or the bichloride. Petresco, after numerous bacteriological and clinical experiments, relies upon Van Swieten's solution* in the treatment of measles, scarlet fever, and small-pox. In scarlet fever the solution of the corrosive chloride was applied directly to the throat, either by penciling or in the form of a gargle.†

Mapother‡ employs mercury externally and internally in the treatment of psoriasis, the blue pill or the protiodide of mercury being usually prescribed.

In syphilis, the rôle of mercury has been considerably abbreviated in recent years. There is no denying that it does rapidly control the early manifestations of syphilis and also those of congenital syphilis, so that it may be considered, within limits, as antagonistic to the syphilitic poison. As mercury is most efficient when it encounters the poison in the blood, it should be given as soon as induration is observed around the primary sore, and the treatment by small doses, avoiding ptyalism, maintained for several months. In some cases there will be no further symptoms; in others, secondaries will appear, but will be much modified. In the secondary stage the mercurial may be combined with iodides, and the tertiary manifestations are generally best treated by iodine without mercury. The mercury with chalk is preferred by Mr. Hutchinson, of London (gr. j, four times daily); Ricord prefers the green iodide (gr. $\frac{1}{3}$, three times daily). Calomel is used by some, corrosive chloride by others. The elder Gross was fond of a biniodide made extemporaneously, as follows:—

℞ Hydrarg. chlor. corrosiv.,	gr. j.
Potass. iodidi,	ʒj.
Aquæ destillatæ,	f℥vj.

M. Sig.: A tablespoonful three times a day.

* Van Swieten's solution is composed as follows: 10 grains each of corrosive sublimate and chloride of ammonium dissolved in a pint of distilled water. Dose, f ʒss-j.

† Recherches Cliniques et Expérimentales sur l'Antisepsie Médicale. Par le Dr. Z. Petresco. Memoire présenté au Congrès de Thérapeutique à Paris en 1889. Jassy: Imprimiére National, 1889.

‡ "The Parasitic Nature of Psoriasis, its Treatment by Mercury," by E. D. Mapother, M.D., F.R.C.S., in British Medical Journal, January 17, 1891.

It may be given directly, as in the "Syrup Gibert":—

℞ Hydrarg. iodidi rubr., ... gr. iij.
Potassii iodidi, ... gr. cij.
Aquæ destillatæ, ... f℥iij.
Cola et adde
Syrupi, ... q. s. ad f℥x.
M. Sig.: A half to a tablespoonful three times a day.

Hurd* writes that the country physicians, as a rule, prefer the "mixed treatment," believing that the combination of mercury with iodide of potassium is admirably adapted to secondary syphilis, and that much less mercury is needed when the mercurial is given along with the iodide of potassium.

In administering mercury for the treatment of syphilis, the author recommends the preparation or the combination with it which he deems best for each case, depending in all instances upon the patient's system. Some do best upon calomel, others upon gray powder or the corrosive chloride, while in very many instances the biniodide or blue pill acts more decidedly. One after the other of the various mercurials first named have often to be tested or combinations containing them made before the form of the drug suitable to the case under consideration can be selected and its use continued for a proper time. In the treatment of secondary and tertiary syphilis by mercury, the author suggests the following formulæ:—

℞ Hydrargyri chloridi corrosivi, ... gr. j.
Tinct. xanthoxyli, ... f℥v.
M. Sig. Two teaspoonfuls in water three or four times a day.

℞ Hydrargyri chloridi mitis, ... gr. v.
Sacchari albi, ... ʒss.
M. et ft. chartæ no. x.
Sig.: A powder three or four times a day.

℞ Hydrargyri protiodidi, ... gr. v.
Quininæ sulphatis, ... gr. xl.
M. et ft. pil. no. xx.
Sig.: A pill three or four times a day.

℞ Pilulæ hydrargyri,
Pulveris zingiberis,
Pulveris capsici, ... āā gr. x vel xx.
M. et ft. pil. no. x.
Sig.: A pill three or four times a day.

℞ Hydrargyri cum cretâ,
Pulveris glycyrrhizæ, ... āā gr. x.
Creasoti, ... ♏j.
M. et ft. chartæ no. xx.
Sig.: From four to six powders a day.

* "The Place of Mercury in Therapeutics," by E. P. Hurd, M.D., Therapeutic Gazette, January 15, 1891.

℞ Hydrargyri chloridi corrosivi, ... gr. j.
Tinct. stillingiæ, ... f℥ij.
Tinct. gent. comp., ... f℥iij.
M. Sig.: Two teaspoonfuls in water three times a day.

Mention has already been made of the hypodermatic, fumigation, and inunction methods of treating syphilis, and it is only needed to add that a drachm or two of corrosive chloride of mercury with twice as much common salt can be added to a bath for syphilitic subjects with skin-lesions. When the patient is much broken down, cachectic and anæmic, mercury should only be given in the tonic doses already mentioned; but, as a rule, the general health should be built up before putting the patient on a mercurial course.

As a rule, the mercurial preparations should not be combined with any other on account of their affinities, which would induce changes that either lessen their efficiency or possibly make them more active than is desirable.

HYDRASTIS (U. S. P.).—Hydrastis, Golden Seal, Yellow Puccoon.

Preparations.

Extractum Hydrastis Fluidum (U. S. P.).—Fluid Extract of Hydrastis. *Dose*, ♏v–xxx.
Extractum Hydrastis.—Extract of Hydrastis (inspissated fluid extract). *Dose*, gr. ii–v.
Tinctura Hydrastis (U. S. P.).—Tincture of Hydrastis (20 per cent.). *Dose*, fʒss–ij.
Hydrastina.—Hydrastine. *Dose*, gr. ss–v.
Hydrastinæ Hydrochloras.—Hydrochlorate of Hydrastine. *Dose*, gr. ss–v.

Pharmacology.—The officinal portions of golden seal, Hydrastis Canadensis, are the rhizome and rootlets. It is a small plant belonging to the Ranunculaceæ, and grows in rich, moist woods, from Canada to Carolina, in the Alleghenies and westward. Its most important constituents are **Hydrastine,** a white crystalline alkaloid, not bitter, although leaving an acrid sensation in the mouth and throat, and **Berberine,** a yellow and intensely bitter crystalline alkaloid, with traces of a third alkaloid, **Xanthopuccine,** which exists in such small quantity as to be of little consequence. It also contains a resin, starch, sugar, etc. The substance used by irregular practitioners under the name of hydrastin is an impure muriate or hydrochlorate of berberine. Both hydrastine and berberine unite with acids to form salts. The dose of the pure non-bitter hydrastine is from gr. $\frac{1}{4}$ to $\frac{1}{2}$; of the impure bitter extract hydrastin the dose is from gr. iii–x; it is unfortunate that the names are almost identical, since the dose is much smaller of the alkaloid than of the common preparation. By decomposing hydrastine with the aid of gentle heat and dilute nitric acid, a new alkaloid, **Hydrastinine,** is formed, together with opianic acid. Recent experiments by Falk show that the hydrochlorate of hydrastinine is a highly valuable remedy. Besides the

officinal fluid extract, which is made with dilute alcohol as a menstruum, an aqueous fluid extract called "fluid hydrastis" is sold, which does not fully represent the root, as it is made with water and glycerin, but is an attractive and useful preparation.

Physiological Action.—Hydrastine is an active poison, causing convulsions, followed by paralysis. Berberine is less convulsant, and has been already discussed. (See page 477.) Hydrastis is possessed of antiperiodic qualities, though ranking much below cinchona. In small amounts it promotes appetite, increases the gastric secretions, acts as a cholagogue, and stimulates peristalsis; in larger doses it deranges digestion and causes constipation. In poisonous doses death may be caused by its action upon the nervous system, from convulsions or paralysis. Introduced into the circulation it causes rise in pressure after a preliminary fall; if in large dose, the pressure falls, the irritability of the vagus is destroyed, and the heart's action is arrested in diastole. As hydrastine is eliminated chiefly by the kidneys, it exerts some diuretic action. The derived alkaloid, hydrastinine, being sparingly soluble in water, the hydrochlorate of hydrastinine has been employed to some extent recently, and the result of the investigation shows it to possess powers like ergot. It is used in 5- to 10- per-cent. solution, hypodermatically. The injections do not cause pain and do not discolor the tissues, but they so readily control hæmorrhage, and especially uterine hæmorrhage, as to constitute this agent a rival of the preparations of ergot. Falk reported 26 cases of uterine hæmorrhage, receiving 400 injections in all, and considers it much more prompt and sustained in its action than ergotine.

Therapy.—The hydrochlorate of hydrastine, 3 grains to the ounce of glycerin, Keyser reports is excellent in some cases of conjunctivitis granulosa. It is also used in nasal catarrh, and in uterine catarrh, or leucorrhœa, both internally and locally. In gonorrhœa, after the acute stage is passed, we may use hydrastin (commercial) in water (gr. v–℥j) twice daily, or ½ drachm of fluid extract may be added to ½ pint of water, and used as an injection in subacute gonorrhœa, vaginitis, and leucorrhœa. As a mouth-wash in syphilitic affections the tincture may be added to water and freely used. The fluid extract, either in full strength or diluted with water, is likewise a beneficial local remedy in mercurial or aphthous stomatitis and follicular pharyngitis. The same application may be made with advantage to fissured nipples and otorrhœa. Hydrastis and the hydrochlorate of hydrastine possesses a sphere of usefulness in dermatology.* From 2 to 6 grains to the ounce of water, or distilled witch-hazel, makes an excellent lotion in hyperidrosis.

* See paper by the author, on "Hydrastis and Hydrastine Hydrochlorate in Diseases of the Skin," in The Medical Bulletin for May, 1885.

Its stimulant effect upon the sebaceous glandular system renders it also of avail in acne and dry seborrhœa. A useful ointment may be prepared by incorporating 5 to 30 grains of the hydrochlorate of hydrastine in an ounce of ointment basis. Hydrastine ointment stimulates ulcers to repair and at the same time destroys the fœtor of unhealthy discharges. For this reason it may be appropriately used as a dressing upon ulcerated carcinoma and in bromidrosis. This ointment is an excellent application to chancroids and chronic eczema:—

℞ Ergotinæ,
Naphthol., ... āā ʒss.
Hydrastinæ hydrochloratis, ... gr. v vel xx.
Bismuthi subnitratis, ... ʒj.
Unguenti simplicis, ... q. s. ad ℥j.
M. Sig.: Useful in hyperidrosis, bromidrosis, acne, and seborrhœa.

℞ Hydrastinæ hydrochloratis, ... gr. v vel xx.
Naphthol., ... ʒss.
Tinct. quillaiæ, ... f℥ss.
Tinct. hamamelidis, ... q. s. ad f℥iv.
M. et ft. sol.
A lotion for hyperidrosis, acne, and seborrhœa.

℞ Ext. hydrastis fld.,
Ext. ergotæ fld., ... āā f℥j.
M. Sig.: Use as a local application. In fissure or prolapse of the anus, ulcerations of the rectum, hæmorrhoids, and ulcerations or erosions of the os uteri.

Unhealthy ulcers, sloughing sores, and chancroids are benefited by the local application of the fluid extract. In affections of mucous membranes, especially of catarrhal character, hydrastis and its preparations are most efficient. In the chronic gastric catarrh of drunkards, in duodenal catarrh with or without jaundice, or chronic catarrh of the intestine with ulceration, it is an excellent remedy. As a vegetable, bitter tonic, it is employed in anorexia and convalescence from fevers. Jordan* reports that in an obstinate case of membranous dysmenorrhœa 25 drops of the fluid extract of hydrastis twice daily, beginning eight days before each menstruation, was followed by a cure. In malarial attacks it is less efficient than quinine in checking the paroxysms, but is useful as a stomachic and general tonic. Hydrastis lessens the discharge of albumin in chronic Bright's disease and of mucus in catarrh of the bladder. Schatz pronounces it a useful agent in controlling hæmorrhages from the uterus. The effects of hydrastis in cancer are very probably limited to its action as a motor nerve-tonic and its stimulating effect upon the digestive organs.

HYDROGEN PEROXIDUM.—Peroxide of Hydrogen.

Pharmacology.—The commercial dioxide or peroxide of hydrogen is a colorless solution of this agent in water. It is without odor, of a harsh,

* Centralblatt für Gynäkologie, No. 2, 1890.

slightly acrid taste, and readily yields oxygen at ordinary temperatures. The usual strength is called the fifteen-volume solution, because each portion of the solution yields fifteen volumes of the oxygen. It is prepared by Charles Marchand, New York, for medical usē, and is an active oxidizing and antiseptic agent. Glycozone is the trade name of a similar preparation in which glycerin is the vehicle.

Therapy.—Though less powerful than many other antiseptics, the solution of hydrogen peroxide has a special place in surgery, gynæcology,* and obstetrics, on account of its power of decomposing pus and destroying the microbes of suppuration. Being free from all irritating qualities, it can be poured over wounds, injected into sinuses, or into the ear, or used as a spray in ulcerations of the pharynx and of the larynx. It produces a frothing up when it encounters pus, owing to the liberation of oxygen, and the cessation of this commotion indicates the removal of all the pus. The surface of the wound or ulcer becomes blanched, but is not injured by the application. Tubercular and mammary abscesses especially are well treated in this way. In ulcerative tonsillitis, fetid breath, and in some bronchial affections, a spray of dilute hydrogen peroxide is productive of benefit. A spray of this agent is likewise of utility in chronic nasal catarrh, ozæna, and scarlatinal angina. It has been administered, well diluted, in gastric affections, and is said to be very useful in flatulent dyspepsia, heartburn, catarrh of the stomach and bowels, etc. In diphtheria and croup its value has been established; a two-volume solution is specially recommended in young children as a local application, and particularly after separation of the membranes, in order to remove the odor and disinfect the surface.† Internally it is too quickly decomposed in the stomach to render much service as a source of oxygen to the blood. It might prove of value in gastric ulcer.

HYOSCYAMUS (U. S. P.).—**Hyoscyamus, Henbane.**

Dose, gr. v–x.

Preparations.

Abstractum Hyoscyami (U. S. P.).—Abstract of Hyoscyamus. *Dose*, gr. $\frac{1}{2}$–ij.

Extractum Hyoscyami Alcoholicum (U. S. P.).—Alcoholic Extract of Hyoscyamus. *Dose*, gr. $\frac{1}{6}$–j.

Extractum Hyoscyami Fluidum (U. S. P.).—Fluid Extract of Hyoscyamus. *Dose*, ♏i–v.

Tinctura Hyoscyami (U. S. P.).—Tincture of Hyoscyamus (15 per cent.). *Dose*, ♏xx–ʒij.

Hyoscyaminæ Sulphas (U. S. P.).—Sulphate of Hyoscyamine. *Dose*, gr. $\frac{1}{60}$–$\frac{1}{32}$.

Extractum Hyoscyami.—Extract of Hyoscyamus. *Dose*, gr. i–ij.

Hyoscinæ Hydrobromas.—Hydrobromate of Hyoscine. *Dose*, gr. $\frac{1}{100}$, hypodermatically.

* "Peroxide of Hydrogen in Gynæcology and Obstetrics," by E. H. Grandin, in The Times and Register, January 31, 1891.

† Dr. E. R. Squibb, "On the Medical Uses of Hydrogen Peroxide," Gaillard's Medical Journal, March, 1889.

Pharmacology.—The leaves of Hyoscyamus niger (Solanaceæ), collected from plants of the second year's growth, a biennial, growing in the Northern United States and in Europe. The chief constituent is an alkaloid, **Hyoscyamine,** which is either an oily liquid or in tufted crystals, yellowish or colorless; with acids it forms permanent, crystallizable salts; its sulphate is officinal. It is isomeric with atropine, and probably identical with **daturine** and duboisine. **Hyoscine** is a derivative of hyoscyamine (which is composed of hyoscine and tropaic acid, according to Gnauck), and is very much more powerful, even $\frac{1}{200}$ grain producing decided effects. The root and the seeds contain more hyoscyamine than the leaves, but their strength is more variable. The inspissated extract of the leaves was dropped from the pharmacopœia on account of its variability and the uncertainty of the dose.

Physiological Action.—The effects of hyoscyamus are similar to those of belladonna and stramonium, but it is more calmative and less irritant. The delirium occasioned by it is not accompanied by hyperæmia. It is sedative in painful affections of the genito-urinary organs, and exerts a mild diuretic effect. Hyoscyamus occasionally gives rise to a bright scarlatiniform rash similar to that produced by belladonna. It is carminative and laxative to the digestive tract. Hyoscyamine and, to a greater degree, hyoscine are valuable as hypnotics in disordered conditions of the mind. They lower the pulse-rate and frequency of the respirations. The heart is slightly depressed; the respiration finally is paralyzed.

Therapy.—In painful affections of the bladder hyoscyamus exerts a soothing influence when administered either by the mouth or in suppositories. Decided relief is given by hyoscyamus in incontinence of urine due to irritability of the bladder and in vesical tenesmus. Dyspnœa and tumultuous action of the heart, dependent upon valvular disease, are materially relieved by the exhibition of hyoscyamus. In colic of various kinds and in constipation it is beneficial, especially to correct the drastic effects of purgatives. In the pains of locomotor ataxia, and in tremor, hyoscyamus is very efficient, as it is also in delirium tremens and the delirium of fever. Irritative cough, asthma, or whooping-cough is sometimes markedly improved by it. The antispasmodic action of hyoscyamus renders it of avail in the management of chorea and hysterical convulsions.

In nervous cough the following prescription will often be found of service:—

℞ Tinct. hyoscyami, ... f℥ss.
Syrup. pruni Virg., ... f℥iiiss.

M. Sig.: Dessertspoonful every third or fourth hour.

Hyoscyamus is capable of ameliorating painful maladies, such as neuralgia, especially visceral neuralgia, herpes zoster, and dysmenorrhœa. In these affections hyoscyamus may be combined with opium in order to counteract the constipating effects of the latter, or may substitute that remedy when peculiar susceptibility to its action exists. Mr. Embleton has found $\frac{1}{64}$ grain each of hyoscyamine and strychnine, given every ten minutes, very useful in seasickness. But it is in asylum practice that the best results from its use have been obtained. Chronic mania and delusional insanity derive benefit from it. Ringer records a case where gr. j of amorphous hyoscyamine was given in acute mania, and it quieted the patient and produced sleep; but he considers it useless in delirium tremens. Hyoscyamine separates from ether in an amorphous form, which is considerably less potent than the crystalline alkaloid obtained from solutions in chloroform. Amorphous hyoscyamine may be given from $\frac{1}{6}$ to $\frac{2}{3}$ or even 1 grain. Ringer expressly states, however, that the maximum dose causes sleep so deep and paralysis so marked as to be alarming, and that smaller doses should be preferred. As a rule, much smaller doses are efficient in acute mania than in the exacerbations of chronic mania.

Hyoscyamine has also proved of great value in recurrent mania. Murrell has found it of good service in chronic dementia, with agitation and destructiveness. It diminishes the number and violence of the attacks in epileptic mania. Hyoscine hydrobromate produces similar results in much smaller doses (gr. $\frac{1}{50}$ by the mouth, gr. $\frac{1}{100}$ hypodermatically). Both of these agents have mydriatic effects, and can be used in ophthalmic practice to dilate the pupil; but duboisine is equally efficient and less expensive for this purpose, and homatropine hydrobromate safer and more reliable. In cases of great nervous excitement and insomnia, Prof. S. B. Howell reports to the author that hypodermatic injections of from $\frac{1}{150}$ to $\frac{1}{80}$ grain of hydrobromate of hyoscine were usually followed, a few moments after administration, by calm slumber. Sleep generally continued for several hours, with no ill effects, as a rule, upon awakening. Slight mental disturbance was occasionally observed as the patient awakened, but even this condition rapidly disappeared. Howell further states that injections of hydrobromate of hyoscine have never failed him in cases which had been upon the protracted use of morphine. Hyoscyamus excels belladonna and stramonium in hypnotic effect, and is consequently useful when a remedy of this character is required by children, by whom it is remarkably well borne. On the contrary, it is not well supported by aged people. A poultice may be made (leaves 2, flaxseed-meal 6, boiling water 20) and employed for the reduction of swellings and the relief of the pains of sores.

HYPNAL.—Monochloral-Antipyrin.

Dose, gr. xv–xxx vel ♏xv–xxx.

Pharmacology.—Chloral forms two definite crystalline combinations with antipyrin, mono- and bi- chloral antipyrin. The first is known as Hypnal, an oily liquid with an ether odor and chloral taste.

Physiological Action and Therapy.—Dr. Schmidt, of Nancy, found that 1 gramme (15 grains) is equal to about ½ gramme (7½ grains) of chloral as a hypnotic; upon respiration it is about equal, while upon arterial pressure and cardiac contractions it has less effect than chloral alone. In the stomach it is more poisonous than the amount of chloral contained in it. Dr. Fraenkel prefers it to chloral because it is nearly tasteless, is devoid of irritating qualities to the mouth or stomach, and considers it an unrivalled soporific, especially when insomnia is the result of pain. It is sparingly soluble, and is given suspended in mucilage, in capsules or cachets. Mattison writes (*Medical Record*) that he regards hypnal as particularly adapted to children and to patients with phthisis, lessening fever, pain, insomnia, and unrest. He recommends the following formulæ of hypnal:—

℞ Hypnal,		♏xv.
Alcohol,		♏lx.
Elixiris vel syrupi,	ad	♏ccxl.

M. Sig.: One dose; to be followed by one-third of a tumbler of water.

℞ Hypnal,	♏xxx.
Mucilag. acaciæ,	f℥j.

M. Sig.: One injection.

℞ Hypnal,	♏xv.

M. Sig.: One dose, hypodermatically.

HYSSOPUS.—Hyssop.

Dose, gr. ii–v.

Pharmacology and Therapy.—The herb Hyssopus officinalis (Labiatæ) contains about ½ per cent. of a volatile oil, with tannin and a bitter principle. It is stimulant, carminative, and sudorific, and is given in solid or fluid extract in stomach disorders, recent colds, etc.

HYSTERIONICA.—Hysterionica.

Pharmacology and Therapy.—The Hysterionica baylahuen (Compositæ) is a native of South America. It is a perennial plant with oval leaves, bears a yellow flower, and contains an ethereal oil having the specific odor of the plant; a greenish-black resin, also of the same odor; gum, and glucose. The resin is excreted by the kidneys, the oil by the lungs. Dr. G. Baillé* reports that the infusion is an excellent remedy in

* Paris Letter, Therapeutic Gazette, September, 1890, p. 640.

diarrhœa, and it has produced good results in both acute and chronic dysentery. It has also been proved useful in the diarrhœa of phthisis or cancer. Hysterionica allays inflammation of the bronchial mucous membrane, lessens expectoration, and quiets cough without causing sickness of the stomach. It promotes the action of the kidneys and diminishes the offensive odor of the urine in vesical catarrh. This remedy increases the acidity of the urine, seems to be without effect upon the perspiratory glands, and assists the healing of wounds. It may be used as a vehicle for remedies like the mercurials in order to prevent the production of diarrhœa. Given in alcoholic tincture it does not produce constipation.* The tincture is made by macerating 100 parts of the drug in 500 parts of 90-per-cent. alcohol for ten days, and its dose is from 15 to 35 drops.

ICHTHYOCOLLA (U. S. P.).—Isinglass, Fish-Glue.

Preparation.

Emplastrum Ichthyocollæ (U. S. P.).—Isinglass-plaster, Court-plaster.

Pharmacology.—The swimming bladder of Acipenser huso and of other species of Acipenser (class, Pisces; order, Sturiones), or, more definitely, the inner membrane of the swimming bladder, which is generally spread out in drying, forming flat sheets, or *leaf-isinglass.* The kind imported from Russia is the most valued. Chemically, it is an exceptionally pure gelatin, known to chemists as glutin; it is free from odor and taste, and is soluble almost without residue in boiling water and in boiling diluted alcohol. Isinglass does not dissolve in cold water as gelatin does, and, therefore, is a valuable constituent of cements. Both are precipitated by tannin.

Therapy.—Isinglass is used for clarifying infusions, and may be boiled with milk for internal use in bowel disorders. A codliver-oil jelly is made by means of isinglass, according to the formula given by Dr. Whitla in his excellent work on Materia Medica:—

℞ Olei morrhuæ,	f℥v.
Ichthyocollæ,	ʒij.
Pulv. sacch. alb.,	℥iss.
Olei amygd. essen.,	♏iv.
Olei pimentæ,	♏iv.
Olei cinnamomi,	♏iij.
Aquæ,	f℥j.

M. This preparation is sometimes taken readily by children, and can be given in teaspoonful doses, alone or in milk, orange-juice, etc.

The well-known court-plaster, spread on silk, affords a convenient method of approximating small wounds and excluding the air; the addition of an antiseptic, like salicylic acid, is an improvement, forming salicylated isinglass-plaster.

* Therapeutic Gazette, vol. xiii, p. 287.

IGNATIA (U. S. P.).—**Ignatia, Bean of St. Ignatius.**

Dose, gr. i–ij.

Preparations.

Abstractum Ignatiæ (U. S. P.).—Abstract of Ignatia. *Dose,* gr. ¼–½.
Tinctura Ignatiæ (U. S. P.).—Tincture of Ignatia (10 per cent.). *Dose,* ♏ii–x.
Extractum Ignatiæ.—Extract of Ignatia. *Dose,* gr. ⅙–½.
Extractum Ignatiæ Fluidum.—Fluid Extract of Ignatia. *Dose,* ♏i–ij.

Pharmacology.—The seed of Strychnos Ignatii (Loganiaceæ) contains two alkaloids, both highly poisonous, **Strychnine** and **Brucine** (from .5 to 1.5 per cent. of each). Strychnine and strychnine sulphate are officinal. (See Nux Vomica for physiological action.)

Therapy.—The medicinal uses are the same as those of nux vomica, except that the dose should be smaller. Ignatia is employed almost exclusively for the preparation of the alkaloids.

INDIGO.—**Indigo.**

Pharmacology.—Indigo is a vegetable coloring agent, obtained from several species of Indigofera (Leguminosæ), of India. It is precipitated from the juices of these plants by macerating the green twigs and leaves and developing a kind of fermentation process. It is sold in masses of a blue or purplish color, and should contain from 70 to 90 per cent. of **Indigo-blue** or **Indigotin.** Indigo is insoluble in water and alcohol. The sulphate of indigo is a pasty mass and mixes with water, forming liquid blue. Used chiefly as a coloring agent and in solution for chemical tests.

Dr. J. L. Jones has used indigo with advantage in thirteen cases of amenorrhœa. He prescribed 2 ounces of indigo mixed with ½ ounce of bismuth subnitrate, and gave one-half teaspoonful in water three times a day. Under its administration the urine becomes brownish green in color and acquires an offensive odor. The stools are liquid and have an obnoxious smell.

INULA (U. S. P.).—**Inula, Elecampane.**

Dose, gr. xv–ʒj, in infusion.

Pharmacology.—The root of Inula helenium (Compositæ) contains a crystallizable substance called Helenin, Alantic anhydride, and Alant-camphor; also crystalline bodies and Alantol, a yellow liquid. Alantic camphor, in taste and smell, suggests peppermint. It is difficult to isolate these substances in quantity, and the alantic anhydride probably differs from helenin only in being less oxidized. The substance which has lately been used to some extent in medicine under the name of helenin appears to consist of the camphor, the anhydride, and helenine proper. Elecampane also contains some bitter extractive, and about 20 per cent. of Inulin,—a peculiar kind of starch not colored blue by iodine.

Physiological Action.—The active principles of elecampane have been

the subject of an investigation by Mr. T. J. Bokenham.* Korab, in 1885, had found that the drug inhibited the development of tubercle bacilli, while Baeza stated that, added to the urine, it prevented putrefaction; that it diminished all the secretions, but especially those of the trachea and larynx. In small doses it was said to prevent the sialagogue and diuretic action of jaborandi. Bokenham has demonstrated that any of the crystalline constituents of elecampane will prevent the growth of the tubercle bacillus if present even in the proportion of 1 to 10,000. The result was the same in the case of all the solid nutrient media usually employed in bacteriological experiments. Liquid media containing large quantities of bacilli in suspension become, upon addition of helenine, incapable of producing tuberculosis, or even an enlargement of the nearest lymphatic glands, when inoculated into healthy guinea-pigs. In studying its effects upon other organisms, Bokenham found that rapidly-growing microphytes were practically unaffected by the presence of even 1 part of the drug in 1000 of the nutrient medium. On the other hand, the streptococci pyogenes, streptococci erysipelatis, and bacillus typhosus refused to grow on these prepared media. In experiments upon guinea-pigs, no ill effect was produced by the drug itself, however great the daily dose administered. In no case was the course of the disease following inoculation with virulent material arrested, although it was considerably retarded. The writer cited does not consider himself justified in stating that any one of the constituents of elecampane-root possesses greater value than the mixed product. According to Marpmann, the excretion of urine and uric acid is increased by inula, and he, therefore, suggests that it may prove useful in chronic gout.

Therapy.—From its influence upon tubercle bacilli, it is possible that helenin may prove useful in the treatment of tuberculosis. A few clinical experiments have been made, but a sufficient length of time has not elapsed to warrant any decisive conclusion as to the results. Hamonic has reported very good results from the use of helenin in uncomplicated leucorrhœa. Applied locally, it irritates the vaginal mucous membrane, but, given by the mouth, it exerts a special influence upon the glands of the cervix uteri. A few doses cause the disappearance of the glairy discharge of catarrhal endometritis. Hamonic has given the drug in the form of a pill containing about $\frac{1}{6}$ grain of crude helenin, two to four pills to be taken in the twenty-four hours.

Inulin has been used, in the dose of 1 or 2 grains, in dyspepsia and chronic pulmonary affections.

The powdered root of elecampane is used in decoction (℥ss–Oj),

* British Medical Journal, October 17, 1891.

sweetened and flavored, which is taken freely as a diaphoretic and expectorant in chronic bronchial and pulmonary affections, dyspepsia, dysmenorrhœa, etc. It has been used, both internally and externally, in eczema and psoriasis.

IODOFORMUM (U. S. P.).—**Iodoform.**

Dose, gr. ii–v.

Preparation.

Unguentum Iodoformi (U. S. P.).—Ointment of Iodoform (10 per cent.).

Pharmacology.—Iodoform was discovered by Serullas in 1822, and introduced into medicine in 1837 by Bouchardat, and also by Dr. R. M. Glover, of London. It is produced by the action of iodine in the presence of alkalies upon alcohol, aldehyde, ether, acetic ether, methylic alcohol, and in minute quantities when acting upon carbohydrates or proteid compounds. Its formula is CHI_3. It occurs in yellow, scaly crystals, having the odor of saffron. It is insoluble in water, but soluble in alcohol, ether, and the fixed and volatile oils. By a temperature of above 239° F. it is fused and decomposed, giving off violet vapors. It is prepared usually by treating an alcoholic solution of potassium iodide with l.me. Iodoform has a sweetish taste and a peculiar, penetrating odor, which adheres persistently to the vessels in which preparations of it have been made, and to the clothing and hands of those who use it. Many attempts have been made, with more or less success, to mask the peculiarly offensive odor of this substance. The essential oils, balsam of Tolu or of Peru, musk, Tonka bean, menthol, eucalyptol, thymol, naphthalin, tar, and creolin have all been used for this purpose. Lindermann's mixture consists of iodoform 1, balsam of Peru, 3, and vaselin 8 parts. Instead of vaselin 12 parts of alcohol, glycerin, or collodion may be employed. Iodoform mixed with 1 or 2 per cent. of creolin and well triturated presents itself in the form of a light-brown powder, having a faint, aromatic odor and soluble in alcohol and ether. This powder has been applied with success by von Jaksch to fulfill all the indications of iodoform.

Pulvis iodoformi dilutus (N. F.) contains iodoform 2, boric acid 3, naphthalin 5 parts, with oil of bergamot q. s. It is in a fine powder, and the odor is entirely masked. The iodoformum aromaticatum (N. F.) contains 4 per cent. of coumarin. The odor of iodoform may be removed from utensils or the hands by washing with a watery solution of tannic acid. Spirit of lavender is also recommended for the removal of the odor of iodoform from the hands. Bienert states that washing the hands once or twice with flaxseed-meal in water causes rapid disappearance of the odor of iodoform.

Iodoform is very volatile, and should be kept in well-stoppered bottles in a cool place.

Physiological Action.—Applied to the sound skin, to mucous membranes, or to ulcers, iodoform (although containing 29 out of 30 parts of iodine by weight) is not in the least irritating, but, on the contrary, blunts sensibility and acts as a local anæsthetic. Internally, in doses up to 5 or 6 grains, it produces no symptoms, except slight increase of appetite; iodine appears in the urine and saliva within two hours and traces continue for several days. In larger doses, iodoform produces decided narcotic effects in dogs, with inco-ordination and staggering, convulsions, and death. In man, poisonous effects have followed its very free use in wounds, the principal symptoms being prostration, headache, faintness, and persistent iodoform taste in the mouth. The temperature is affected, being increased to 104° F. or more; the pulse becomes soft, feeble, and rapid; delirium and suicidal mania have also been noticed. Several cases of death have been caused in this way, preceded by great anxiety and restlessness and sudden collapse. In cases of death from this substance the kidneys, liver, heart, and voluntary muscles have been found in a state of fatty degeneration. There is no doubt that in some patients an idiosyncrasy exists with regard to iodoform, just as there is with regard to the other iodides. In a case witnessed by Demme, chorea appeared as one of the manifestations of iodoform poisoning. A severe general dermatitis, followed by desquamation and accompanied by a profuse diarrhœa, was observed by Kloman in consequence of the application of iodoform to a chronic leg-ulcer. The first step in the treatment of toxic symptoms is the prompt removal of the iodoform from the body in order to prevent further absorption; in many cases this is all that is necessary. As remedial agents, stimulants are required, and elimination favored, by sponging the skin frequently with warm water and alcohol, and the administration of mild diaphoretics. It is especially advised that iodoform should not be used with carbolic acid; that only small quantities should be dusted over the wound; that close sutures and tight bandages be avoided and free drainage maintained. As some specimens of iodoform have been found to be adulterated and colored with picric acid, bad results might be due to this cause. Potassium bicarbonate, given hourly in the dose of 10 grains, is said to counteract the toxic effects of iodoform.

The potassium bromide is also regarded as antidotal, not only as a neutral potash salt, but also by virtue of its specific bromide action, and the fact that it excels all other salts as a solvent for iodoform. Iodoform escapes by the breath under its own form, and by the urine as iodide with a little iodate.

Therapy.—The anæsthetic and antiseptic qualities of this agent make it a useful application, especially in gunshot and infected wounds, chancroids, phagedæna, and sloughing ulcers. It acts as an antiseptic, not by destroying bacteria, but by sterilizing the soil in which they might develop, and, possibly, by neutralizing or destroying bacterial products. Either in the form of powder or the officinal iodoform ointment, it is valuable in bed-sores, lupus vulgaris in the ulcerative stage, enlarged or ulcerated scrofulous glands. The ointment reduces inflammatory action in buboes and may prevent suppuration. It is at times attended with very good results in chronic eczema, and has been recommended in prurigo. In half or quarter strength this ointment is useful in ophthalmia and granular lids. It diminishes the pain of ulcerated carcinoma. In cancer of the womb, a bolus is recommended by Ringer containing from 8 to 16 grains of iodoform incorporated in cacao-butter. This suppository can be deposited in the cavity of the malignant ulcer. The swelling and pain of orchitis are diminished by the application of iodoform ointment. A saturated solution of iodoform in chloroform relieves the pain of neuralgia and chronic gout.

It is a useful application, in the form of ointment or soluble bougies, to the urethra in the treatment of gleet or chronic gonorrhœa. In painful affections of the rectum and bladder, fissures, hæmorrhoids, suppositories of iodoform containing 5 grains afford great relief. Its solution in ether (1 to 4), kept in red-glass bottles, is a valuable agent in treating ulcers of the mouth and throat. It has been shown by P. Carles that a saturated solution of iodoform in ether is very unstable, liable to sudden decomposition, the liquid assuming a reddish color as a result of the liberation of iodine. The addition of alcohol and absence of light retard this change. Combined with tannin and triturated together, iodoform is a good astringent for soft hypertrophies in the nose, or insufflated into the pharynx for post-nasal catarrh, and into the nasal chambers for ozæna. The following emulsion is recommended by L. Frey as an injection for cystitis:—

Iodoform,	50 parts.
Glycerin,	40 "
Distilled water,	10 "
Tragacanth,	25 "

A teaspoonful of this mixture is added to a pint of warm water, and, after being shaken thoroughly, used as an injection. The procedure is repeated every three days until four injections have been given, after which once a week will suffice. Professor Billroth has obtained most gratifying results from the use of an iodoform emulsion in cold abscess and tuberculous caries. His mixture contains 10 grammes of pulverized

iodoform in 100 grammes of glycerin. After the most scrupulous antiseptic precautions, the abscess is cut down upon and opened, the carious bone is scraped thoroughly, and the cavity in each case cleansed. The inner surface of the abscess-wall is firmly rubbed by a large pledget of iodoform gauze, the wound is then stitched up, except a large opening through which the emulsion is poured into the cavity of the abscess or the bone. Recovery sometimes takes place by the first intention. Usually a second dressing is soon required; drainage-tubes are inserted, the deep parts close by first intention, and the superficial granulating wound heals under an ointment. In other cases more suppuration occurs and recovery is less rapid, or, perhaps, the operation must be repeated. The most forbidding cases of large abscesses, with numerous fistulæ, yielded the best absolute results. A 4-per-cent. solution of iodoform in spirit of turpentine has been found useful, administered in the form of inhalation, for laryngeal or pulmonary tuberculosis and bronchorrhœa.

℞ Iodoform., ... ʒj.
Ol. terebinth., ... f℥j.

Administer from 3 to 5 drops by inhalation in phthisis and bronchiectasis with high temperature.*

It may merely be added, in conclusion, that in children intoxication rarely occurs as a result of the local use of iodoform, but that old people are very susceptible to its action.

Various expedients have been suggested to disguise or cover the odor of iodoform, such as the addition of a small quantity of oil of citronelle, balsam of Peru, or mixture with recently-ground coffee (see also page 689). The best is, probably, that discovered by Shufelt, of dissolving the iodoform in the volatile oil of camphor. This combination was used both as an ointment and a paste, and good results have been obtained from its inhalation in bronchiectasis and phthisis. If preferred, the odor of camphor can also be removed by the admixture of either oil of bitter almonds or Canada balsam. Bienert states that washing the hands once or twice with flaxseed-meal in water causes rapid disappearance of the odor of iodoform. For venereal sores:—

℞ Iodoform., ... ʒj.
Ol. camphoræ,
Acid. salicylic., ... āā ʒiv.
Amyli, ... q. s.

M. Sig.: Make a stiff paste for application to ulcerated surface.

It can also be obtained combined with dressings, as iodoform gauze, cotton, or wool, for use as tampons. When applied to the surface of the body dissolved in collodion, it reduces temperature. In cancer of the

* Dr. Powell, Quarterly Bulletin of Clinical Surgery of N. Y. Post-Graduate School.

breast, iodoform in powder, or in ointment, markedly relieves pain and renders the progress of the disease slower.

Internally, iodoform has been employed as an alterative and as a means of bringing the system under the effects of iodine in phthisis, scrofulous affections, and liver disorders, but has not always fulfilled anticipations. Dr. Whitla speaks in very favorable terms of the internal use of iodoform in phthisis, confirming the reports of Dreschfeld and other writers. It is administered in pills, together with extract of gentian or other stomachic tonic. The same combination has been employed in hæmoptysis with the most satisfactory results by Chauvin and Jorisenne. They have seen it succeed where ergotin had failed. If considered judicious, tannin may be incorporated in each pill. Thus given, it creates no gastric irritation. In constitutional syphilis iodoform has failed to approve itself as a superior remedy. In gastric catarrh iodoform renders service in checking fermentations, but its powerful odor renders it objectionable to patients.

IODOL.—Tetra-iodo-pyrol.

Dose, gr. $\frac{1}{4}$–v.

Pharmacology and Physiological Action.—By the action of iodine upon pyrol, a constituent of mineral oil, a chemical compound is formed containing about 90 per cent. of iodine; therefore a little less than iodoform, but having the important advantage of freedom from odor. Iodol occurs as a grayish-white powder, which darkens upon exposure to light; insoluble, or nearly so, in water; freely soluble in ether, chloroform, or alcohol, and in fatty oils. It is soluble in the gastric secretions, and, like iodoform, is decomposed in the organism.

The effects of iodol are similar to those of the preceding agent, but it is said never to produce toxic action when used either as a topical application to wounds, or when administered internally in the ordinary medicinal doses.

Therapy.—Iodol may be dusted over wounds in the form of an impalpable powder, or it may be used in ointment or solution. An ointment of iodol may be made of any desired strength, from 10 grains to the ounce upward, and constitutes an excellent antiseptic dressing to venereal and common ulcers, furuncles, and carbuncles. A weak ointment containing this substance is beneficial in variola, in which it mitigates the active cutaneous inflammation. A stronger preparation may be employed in tinea tonsurans, and is capable of modifying the course of psoriasis. Iodol ointment is used with advantage upon the enlarged glands of scrofula, or upon the ulcers consequent to their caseous degeneration. Mazzoni prefers a solution in alcohol and glycerin (iodol 1, alcohol 16,

glycerin 34 parts) as a topical application. An ethereal solution (1 to 8) is used as that of iodoform is,—in ulcers of mucous membranes. Administered by insufflation or inhalation, this remedy has afforded relief in tuberculosis of the larynx or lung, and in bronchorrhœa. The powder has been found of service in various diseases of the eye, and is of special value in catarrhal conjunctivitis. Iodol is also made into suppositories, soluble bougies, iodol cotton, iodol gauze, etc. It may be administered internally in any form—since it has very little taste and yields iodine to the organism very readily—in the treatment of the tertiary stage of syphilis, in scrofula, phthisis, etc. In these affections from 5 to 20 grains have been given daily, and in the dose of 2 to 6 grains thrice daily Cerna has seen good results from the use of iodol in diabetes.

IODUM (U. S. P.).—**Iodine.**
Dose, gr. ss–j.

Preparations.

Amylum Iodatum (U. S. P.).—Iodized Starch (5-per-cent. iodine). *Dose,* gr. ii–ʒj.

Liquor Iodi Compositus (U. S. P.).—Compound Solution of Iodine, Lugol's Solution (iodine 5, potass. iod. 10, distilled water 85 parts). *Dose,* ♏v–xx.

Tinctura Iodi (U. S. P.).—Tincture of Iodine (iodine 8 per cent). *Dose,* ♏i–v.

Unguentum Iodi (U. S. P.).—Iodine Ointment (iodine 4, potass. iodid. 1, water 2, benzoinated lard 93 parts).

Liquor Arsenii et Hydrargyri Iodidi (U. S. P.).—Solution of Iodide of Arsenic and of Mercury (Donovan's solution, 1 per cent. each of iodide of arsenic and of biniodide of mercury). *Dose,* ♏i–x.

Pilulæ Ferri Iodidi (U. S. P.).—Pills of Iodide of Iron (ferrous iodide, gr. j). *Dose,* 1 or 2 pills.

Ferri Iodidum Saccharatum (U. S. P.).—Saccharated Iodide of Iron (iron 6, iodine 17, with sugar of milk 80 parts). *Dose,* gr. ii–x.

Syrupus Ferri Iodidi (U. S. P.).—Syrup of Iodide of Iron (10 per cent. Fe I). *Dose,* ♏v–xxx.

Syrupus Acidi Hydriodici (U. S. P.).—Syrup of Hydriodic Acid (1 per cent. of absolute acid). *Dose,* fʒss–ij.

Potassii Iodidum (U. S. P.).—Iodide of Potassium. *Dose,* gr. v–xxx.

Unguentum Potassii Iodidi (U. S. P.).—Iodide of Potassium Ointment (iodide 12, sodium hyposulphite 1, boiling water 6, benzoinated lard 81 parts).

Sodii Iodidum (U. S. P.).—Iodide of Sodium. *Dose,* gr. v–xxx.

Ammonii Iodidum (U. S. P.).—Iodide of Ammonium. *Dose,* gr. v–xxx.

Argenti Iodidum (U. S. P.).—Iodide of Silver. *Dose,* gr. i–ij.

Arsenii Iodidum (U. S. P.).—Iodide of Arsenic. *Dose,* gr. $\frac{1}{20}$.

Sulphuris Iodidum (U. S. P.).—Iodide of Sulphur. *Dose,* gr. i–iv.

Unguentum Sulphuris Iodidi.—(gr. xxx to lard ℥j).

Hydrargyri Iodidum Viride (U. S. P.).—Green Iodide of Mercury. *Dose,* gr. $\frac{1}{10}$–$\frac{1}{3}$.

Hydrargyri Iodidum Rubrum (U. S. P.).—Red Iodide of Mercury. *Dose,* gr. $\frac{1}{40}$–$\frac{1}{16}$.

Plumbi Iodidum (U. S. P.).—Iodide of Lead. For external use.

Zinci Iodidum (U. S. P.).—Iodide of Zinc. *Dose,* gr. i–iij.

Iodi Trichloridum.—Trichloride of Iodine. For external use.

Acidum Carbolicum Iodatum.—Iodized Phenol (iodine 20, carbolic acid 76, glycerin 4 parts). For external use.

Ethyli Iodidum.—Iodide of Ethyl (hydriodic ether). *Dose,* ♏x–xv. For inhalation.

Pharmacology.—Iodine is a bluish-gray, non-metallic element, obtained principally from the ashes of sea-weeds. It was discovered in 1811 by Courtois, and its properties investigated by Gay Lussac in 1813. Iodine melts and sublimes at about 225° F., but volatilizes at ordinary temperatures so that the upper part of the bottle containing it is usually filled with the characteristic violet vapor of iodine. It is very slightly soluble in water, requiring 7000 parts of water; on the contrary, alcohol and ether dissolve it freely, forming dark-brown solutions. The addition of water to the alcoholic solution precipitates part of the iodine, unless iodide of potassium be added to the solution. The tincture of iodine may be decolorized by the addition of a small quantity of ammonia-water, followed by a few drops of carbolic acid, or by combination with hyposulphite of sodium, making colorless tincture of iodine. The ammonia preparation should not be made in quantity or kept on hand, as it may deposit the iodide of nitrogen, which is a dangerous explosive compound. The combinations of iodine are numerous, and many of them are officinal The iodide of ethyl is not included in the pharmacopœia, but has some medical interest. It is prepared by the action of alcohol on iodine in presence of amorphous phosphorus. Phosphorus iodide is formed and reacts upon the alcohol, yielding ethyl iodide and an acid of phosphorus. The former distils into the receiver together with the alcohol, which escapes the reaction. Water is added and the lower layer of liquid is separated, dried with calcium chloride, and rectified in a water-bath. Ethyl iodide is a colorless liquid, but becomes brown when long kept, if exposed to light. Its characters have been already considered (see page 409). The syrup of hydriodic acid contains 1 per cent. of absolute hydriodic acid, which is a gaseous body containing 99¼ per cent. of iodine by weight; it is readily decomposed, and is a valuable agent for the purpose of introducing iodine into the system in the least irritating form, though therapeutically active. The iodide of starch, amylum iodatum (not to be confounded with amyli iodidum, iodide of amyl), was made officinal as a means of administering iodine, but it has been given in quantities as high as an ounce at a time with little noticeable effect, and is seldom used at present. This may be explained by the fact that starch is the antidote to iodine, and is the chemical test for free iodine, by which it is turned from a white color to blue. (For a combination of iodine and thymol, see Aristol, page 452.) Iodine trichloride occurs in yellow pieces, and is decomposed by water into hydrochloric and iodic acids. It is liquefied by the addition of iodine.

As the iodides are easily decomposed this fact must be borne in mind when prescribing them, and, as a rule, it is best to administer them simply dissolved in water or combined with other iodides. When potassium

iodide is present in solution with corrosive sublimate the biniodide is formed, which is again dissolved in an excess of potassium iodide, forming iodohydrargyrate of potassium. Alkalies, alkaloids and metallic salts generally are incompatible with iodine and its salts.

Physiological Action.—Iodine discolors the skin, turning it brown, and, if sufficiently concentrated, acts as an irritant, and may cause vesication or sloughing. After a coat of iodine there is some hyperæmia, and the sensory nerves are stimulated so that the effects of a counter-irritant are obtained; subsequently, the superficial epithelial layer becomes dry and peels off, leaving a reddened surface Its vapor is rather irritating to the air-passages. Iodine is a valuable antiseptic, and, when inhaled into the bronchial tubes, or separated from the general circulation and deposited upon the surface of the bronchial mucous membrane, it exercises a beneficial influence upon the tissues and prevents decomposition of the secretions. In the stomach it is at first irritant, but rapidly forms combinations with organic or starchy compounds and passes into the blood, where it acts as an alterant, and especially counteracts the effects of the syphilitic virus and promotes the absorption and removal of its products from the body. To a less marked degree this remedy acts upon the tissues affected by tuberculosis, removing effete material and rendering them less favorable for the development of bacilli. The iodides of the alkalies are very soluble (potassium iodide dissolving in its own weight of water), and diffuse readily into the blood. They are excreted especially by the air-passages, and frequently set up a coryza and profuse mucous discharge from the bronchial mucous membrane, accompanied by swelling, congestion, or inflammation of the throat and conjunctivæ, with more or less irritation of the kidneys and skin.

The most common form of iodide eruption is that of papules, or wheals, which are darker than the surrounding skin and surrounded by a zone of inflammation (acneiform); but occasionally, from some peculiar susceptibility to the action of the drug, the degree of hyperæmia is so great as to lead to effusion beneath the epidermis, and vesicles are formed, filled with clear lymph, which afterward becomes white or milky. Sometimes the eruption is so universal that it resembles chicken-pox, purpura, or small-pox, but is unaccompanied by fever, or by more than a temporary elevation of temperature. Other symptoms, such as headache, unpleasant taste in the mouth, ptyalism, disordered digestion, malaise, and emaciation, appear after the system has become saturated with the drug, and these symptoms indicate the condition of **iodism**, which varies in degree from merely a few acneiform papules upon the forehead to a state of irritant poisoning. Œdema of the glottis is an occasional effect of the ingestion of iodide of potassium. This manifestation, which takes place in the

absence of any pathological condition of larynx or kidney, has recently been made the subject of a paper by Dr. Grœnouw. This writer refers the origin of the accident to idiosyncrasy, and remarks that it does not follow the repeated administration of large doses of the salt, but manifests itself after a few comparatively small doses have been taken.* Other unusual manifestations of iodine poisoning are occasionally witnessed. Gautier lately reported a case in which the symptoms were thought to be due to prolonged inhalation of sea-air, and another in which iodism was caused by inunction with iodide of potassium. Each of these cases was marked by emaciation and prostration. In the second case fixed delusions and melancholic mania were present. The treatment of iodism is largely symptomatic, using starch if there is free iodine in the alimentary canal, deodorized tincture of opium, warm baths, and large draughts of water and demulcents.

Chemical considerations have suggested the theory that the phenomena of iodism are due to the liberation of iodine by nitrites present in the blood. This change can only take place in regions where the reaction is acid. Since sulphanilic acid destroys nitrous acid, it has been proposed that the former substance, together with the bicarbonate of sodium, should be used as an antidote. According to Röhmann and Malachowski, from 2 to 3 drachms of the bicarbonate of sodium, given in two doses within twenty-four hours, will cause the symptoms of chronic iodine poisoning to disappear. These writers likewise claim that when iodide of potassium and bicarbonate of sodium are administered in combination, the symptoms of iodism are prevented. The carbonate or the aromatic spirit of ammonium has been given with the iodide for the same purpose, but with doubtful results. A few drops of Fowler's solution, given in conjunction with the iodide, is, however, more effective, and will usually prevent the development of iodism. It should not be forgotten that even a small dose of iodine will, in some persons, produce marked physical and mental depression without the occurrence of coryza, sore throat, or disturbed stomach. An acute form of intoxication may also arise from the administration of iodine, the symptoms being those of acute gastro-enteritis, the treatment consisting of starch-water, evacuation of the stomach, external heat, and hypodermatic injections of cardiac and respiratory stimulants. In a case of chronic poisoning, with alarming prostration, Whitla availed himself of the fact that elimination takes place largely by the salivary glands, and directed his patient to chew pellitory root, a powerful sialagogue. A remarkably profuse secretion of saliva containing the iodide was followed by rapid improvement.

The iodides remove certain metallic poisons from the system by

* Revue de Laryngologie, etc., September 15, 1890; Medical Bulletin, February, 1891.

combining with them to produce soluble salts; in such cases large doses of iodides might liberate so much of the metal from the tissues as to produce symptoms of metallic poisoning. This is exemplified by the fact that the iodide of potassium may occasion salivation in an individual who has been upon a mercurial course. If a considerable quantity of the metal have been stored up within the system, its solution and entrance into the circulation may be followed by ptyalism. On the other hand, when there has been less accumulation of the mercury, iodide of potassium will rapidly remove it from the system. The iodide thus exerts an apparently paradoxical action, in that it sometimes relieves and at others augments mercurial ptyalism. In recent cases of mercurialism, however, the iodide will but add to the mischief.

Patients should be warned, on the appearance of such symptoms or on the occurrence of iodism, to at once discontinue the remedy. Some are unable to bear more than a few grains, and even so small a quantity as 5 grains may produce coryza, salivation, or a general vesicular eruption upon the skin; others can take as many drachms without the slightest inconvenience, and some dermatologists give from 12 to 16 drachms of potassium iodide a day for tertiary syphilis without producing iodism. Part of the good effects of codliver-oil in these disorders is ascribed to a small proportion of iodine which it contains.

In the normal condition the iodides and iodine have no effect upon temperature or blood-pressure, when administered by the ordinary channels. Introduced into the veins, they cause slight increase, soon followed by decrease, of pressure. Anaphrodisiac effects are observed after the long-continued use of the iodide of potassium, and the belief is generally entertained, though disputed by some, that such protracted use causes atrophy of the mammary glands and testicles.

Owing to its solubility the iodide of potassium is rapidly absorbed and rapidly eliminated. Within fifteen minutes after its ingestion it is present in the saliva and the urine. It is likewise removed by the skin, and in the milk of nursing women. Iodine has been found in the urine of a suckling babe, whose mother was taking iodide of potassium. The urine is increased in quantity by the iodide of potassium, though we lack exact knowledge of the effect of this drug upon the urinary constituents. It often causes oxalates to appear. In a series of experiments upon himself, M. Georges Doux took 45 grains of the iodide of potassium twice daily for twenty consecutive days. After the second day the quantity of the salt present in the urine varied but little, and amounted to about 90 per cent. of the dose ingested. The normal proportion of urea was decreased by about one-fifth. Seventy-five hours after discontinuance of the drug no trace of it could be discovered in the urine. The

experiments were twice repeated with the same results. The amount of iodide eliminated fell to 60 per cent. if a little absinthe had been taken on the preceding day.*

Therapy.—Iodine in substance may be used as a disinfectant for drains, but it has no advantage over much less expensive agents which are better antiseptics. In the form of tincture it is very generally used as a counter-irritant and resolvent for various swellings, enlarged glands, buboes, swollen joints, abscesses, chilblains, and inflammation of the gums.

The dental tincture of iodine used by Flagg is as follows:—

℞ Tinct. iodi, ... f℥iij.
Spiritus vini rectificati, ... f℥j.

M. Dissolve the iodine by succussion during several days.

The object attained, says Flagg, by this extraordinary tincture is the ability to make accurate spottings upon the inflamed gums, which shall maintain circumscribed and persistent absorbent or counter-irritant effect. The parasiticide effects are shown when this tincture is painted over a spot of tinea or ringworm, which may yield to this treatment.

For toothache from exposed pulp, Garretson recommends the following:—

℞ Creasoti, ... ♏vj.
Tinct. iodi, ... f℥j.
Liq. plumbi subacetatis, ... f℥j.
Chloroformi,
Tinct. opii, ... āā f℥ss.

M. Sig.: Apply on the softest cotton-wool, laid delicately upon the pulp. Brush the same on the surrounding gum.

The dental iodide-of-potassium ointment, recommended by Flagg, consists of the following:—

℞ Potassii iodidi, ... gr. xx.
Liquoris potassæ, ... ♏ii vel iij.
Ceratum simplicis, ... ℥j.

M. et ft. ungt.

This is a valuable ointment which will not discolor the skin, used in discussing indurations on or about the face and jaws.

In pneumonia and pleurisy, especially of the chronic form, or fibroid phthisis, great benefit results from painting the affected side of the chest with iodine, giving several coats of the tincture with a camel-hair brush, repeated each day until sufficient action is set up or the skin peels off. Part of the iodine is absorbed and exercises a local alterative effect.

In chronic bronchitis, also, the tincture of iodine is serviceably

* British Medical Journal, September 27, 1890.

applied to the chest. The ointment, tincture, or liniment of iodine affords relief in intercostal neuralgia and rheumatism affecting the intercostal muscles. The conjoined internal and external use of iodine is of great value in bronchocele. In simple glandular hypertrophy the compound solution of iodine or the iodide of potassium, preferably the latter, is administered by the mouth; while the tincture, liniment, or ointment is locally applied, care being taken to avoid vesication. The iodide-of-potassium ointment is sometimes employed for the same purpose or the formerly officinal ointment of the red iodide of mercury.

Another excellent method consists in the injection of tincture of iodine into the substance of the goitre. It is best to begin with no more than 5 drops, the operation being repeated weekly or semi-weekly, and the quantity gradually increased to 10, 15, or 20 drops. In cystic or calcareous degeneration of the thyroid this plan of treatment is of no avail. Other hypertrophies are amenable to the same method, as, for instance, enlarged lymphatic glands prior to caseation and enlarged spleen. The cavities of abscesses and monocystic tumors are, after evacuation, advantageously flushed with water impregnated with a small quantity of tincture of iodine. Empyema has been treated in the same way after aspiration.

Since proposed, in 1848, by Dr. Brainard, the injection of iodine has been practiced with varying and doubtful success in spina bifida. Cures have been reported, while, on the other hand, many failures, whether reported or not, have occurred. If this operation be undertaken the quantity injected should be small and the solution weak. No more serum should be withdrawn than the quantity of fluid about to be injected. Pepper and others have injected the tincture of iodine into pulmonary cavities with a view to disinfection, and, possibly, obliteration by healthy reparative inflammation. Though the plan seems rational it is not always feasible, is attended by some pain and reaction, and certainly has never been generally approved or adopted.

An iodized wash disinfects these cavities and promotes their obliteration. The parenchymatous injection of a few drops of tincture of iodine causes resolution of enlarged tonsils. In performing this operation the close proximity of the carotid artery should be borne in mind. The ointment, applied directly to the tonsils by means of a camel-hair brush, is said by Cerchiari to accomplish the same result. The following prescription can sometimes be used with good effect in enlarged tonsils or in chronic pharyngitis:—

℞ Tinct. iodi, ... f℥j.
Glycerini,
Extracti ergotæ fl., ... āā f℥j.
M. Sig.: Apply once or twice a day with a camel-hair brush.

Garretson employs in sore throat, especially that which occurs in clergymen and public speakers, the following combination of iodine:—

℞ Liq. iodi compositi,	f℥j ♏xx.
Acidi carbolici,	♏xij.
Glycerini,	f℥ij.
Aquæ,	f℥xiv.

M. Sig.: To be used as a gargle from eight to a dozen times a day.

The tincture of iodine is often painted upon or around patches of erysipelas, and, although the application sometimes does good, it not infrequently aggravates the condition. It is judicious to dilute the preparation with an equal quantity of glycerin or alcohol, or combine the iodine as follows:—

℞ Tinct. iodi,	
Acidi carbolici,	āā f℥ss.
Glycerini,	f℥iv.

M. Sig.: Apply with a camel-hair brush several times a day for erysipelas.

In ringworm, iodine may be used in the form of colorless tincture, or in combination with the colorless oil of tar (1 in 4):—

℞ Potassii iodidi,	ℨij.
Ol. menth. pip.,	♏xx.
Lanolini,	f℥j.

M. Sig.: Embrocation for painful joints, neuralgia, chronic rheumatism, etc.

The tincture of iodine is one of the articles employed to prevent pitting in small-pox. The solution should be painted over the surface of each pustule. An ointment containing iodine is occasionally followed by good results in keloid and scleroderma. Alone or combined with an equal quantity of glycerin or carbolic acid, the tincture of iodine is sometimes beneficial when painted upon lupous areas. Lentigo and chloasma may be cured by the local application of tincture of iodine, and the same preparation added to salt water forms a beneficial wash in chronic ozæna. In orchitis, after active inflammation has subsided, the cautious local application of the tincture promotes absorption of the exudation material. The same treatment is of service after subsidence of inflammation of the mammary gland or ovary.

Boils and carbuncles may be checked by painting iodine freely upon a neighboring vascular area. Iodine may be used as a stimulant to old ulcers, especially in gynæcology, as iodized phenol; although iodoform, on account of its anæsthetic effects, has largely taken the place of iodine. A saturated solution of tannic acid in tincture of iodine is also a useful topical application in chronic inflammation of the uterine canal. The iodide of starch is valued by Mr. Marshall as a dressing to syphilitic ulcers. Hydrocele is cured by evacuation of the contents of the sac

and injecting 15 to 20 minims of tincture of iodine into the cavity, as practiced by Professor Pancoast. Severe inflammation results and the sac becomes obliterated. Iodized wool is useful for making extemporized pessaries.

Internally, tincture of iodine and camphor may be inhaled for acute coryza and hay asthma.* Inhalation of the vapor of iodine is very beneficial in chronic bronchitis with bronchiectasis, or profuse and fetid muco-purulent expectoration. Bartholow speaks favorably of the internal use of iodide of ammonium in acute catarrh, a grain being given every second hour. Hay asthma is ameliorated by larger doses of the same remedy, which is useful, moreover, in capillary bronchitis and bronchorrhœa. An acute coryza may not infrequently be aborted by 10 grains of iodide of potassium taken at bed-time. The same salt in the same dose repeated several times a day is said to relieve paroxysmal sneezing.

The iodide of ethyl (see page 409) is administered by inhalation (♏x–xxx) whenever necessary to relieve coughing, especially in bronchitis, asthma, and phthisis, and is the most direct method of introducing iodine into the blood. In phthisis, good results have been reported from inhalation, by means of an atomizer, of a fine spray containing 1 part each of iodide of potassium and bichloride of mercury in 1000 of water, the solution being made stronger or weaker, according to the effects upon the patient. From its stimulating effects upon the kidneys iodide of potassium is occasionally used to heighten the effect of other diuretics. The œdema of Bright's disease is, in some instances, markedly decreased by this remedy, though it has little power to check the escape of albumin. The iodide of potassium, from its special determination to the mucous membrane of the air-passages, is frequently combined with expectorants and cough-mixtures in order to render the secretions more fluid. Its stimulating action upon the absorbents renders iodine useful, both internally and by topical application, in cases of inflammatory exudation or chronic enlargements. Where these are of syphilitic character the iodides are pre-eminently serviceable. For many brain diseases, more especially those occurring during tertiary syphilis, where gummata form or meningitis with exudation occurs, causing great pain, the iodide of potassium, in combination with bromide, is more efficient than any other agent known; here the iodide must be given in ½-drachm or drachm doses, and pushed in order to get its full effect. If given well diluted with water, when the stomach is empty, no serious danger exists of producing iodism. In aortic aneurism, iodide of potassium, in doses of 20 to 30 grains four times a day, with

* Therapeutic Gazette, October 15, 1890, p. 678.

low diet and rest in bed, favors deposit of fibrin and obliteration of the tumor; the treatment must extend over months or for a year or more. Many of these cases may be occasioned by syphilitic disease of the aorta, and in this way the iodide is doubly serviceable. In the primary and secondary forms of syphilis iodine compounds are of little use, but in the later changes of the skin, mucous membranes, and deeper structures they act promptly, and we may prescribe them with confidence.

In some of the late varieties of syphilis* the author can recommend the following formulæ containing the iodides:—

℞ Potassii iodidi,	ʒv.
Tinct. cimicifugæ,	fʒij.
Syr. sarsaparillæ comp.,	f℥v.

M. Sig.: Two teaspoonfuls in water three or four times a day.

℞ Sodii iodidi,	ʒiiss.
Vini cocæ,	f℥x.

M. Sig.: A tablespoonful three or four times a day.

℞ Ammonii iodidi,	ʒv.
Tinct. nucis vomicæ,	fʒj.
Ext. cascaræ sagradæ fl.,	f℥j.
Glycerini,	f℥iv.

M. Sig.: Two teaspoonfuls in water three or four times a day.

In the treatment of gonorrhœal rheumatism, Schüller, of Berlin, gives iodide of potassium (gr. v–vij) every two hours for two or three days. He considers it especially beneficial in the acute form. For local treatment he uses, in acute cases, compresses wet with carbolic-acid solution (1 to 100), and in chronic cases mercurial ointment. Aspiration of the joint is done where there is abundant effusion, and this procedure aids the action of the remedy. In chronic gout and in gouty affections, iodide of potassium affords great relief, as it will also in chronic rheumatism. Considerable improvement sometimes follows the use of iodide of potassium or of iron in rheumatoid arthritis. Acute rheumatism is often relieved by large doses of iodide of potassium, or the latter in combination with the salicylate of sodium or salicin:—

℞ Potassii iodidi,	
Sodii salicylatis,	āā ʒiiss.
Spiritus ætheris nitrosi,	f℥ij.
Syrupi aurantii,	f℥iij.

M. Sig.: Two teaspoonfuls in water every two or three hours.

℞ Potassii iodidi,	
Salicin.,	āā gr. c.

M. et ft. capsulæ no. xx.
Sig.: Two to three capsules every two or three hours.

* For the general medicinal treatment of late syphilis see author's Practical Treatise on Diseases of the Skin, pages 178 and 179. D. Appleton & Co., New York, 1888.

In acute rheumatism or gout, when attended with constipation, the following prescription, containing iodide of potassium, is serviceable:—

℞ Potassii iodidi,		
Potassii acetatis,	āā	ʒiiiss.
Extracti cascaræ sagradæ fl.,		
Glycerini,	āā	℥j.
Aquæ cinnamomi,		f℥iij.

M. Sig.: Two teaspoonfuls in water every two or three hours.

In the treatment of psoriasis* large doses of one of the iodides, and preferably the iodide of potassium, is at times attended with complete removal of the eruption. Psoriasis is, however, more frequently controlled or cured by the iodide of potassium when the disease is depending upon rheumatism or gout. In periostitis, resulting from exposure to cold or wet, the iodides are rapidly curative, and the tincture may also be applied locally. In chronic mercury or lead poisoning the metal may be removed from the system by iodides, but the dose should be small and the treatment continued for some time. Chronic bronchitis with thick, tenacious sputa and asthma are very much helped by the administration of the iodides. Catarrhal pneumonia, acute or chronic, is benefited by doses large enough to liquefy the sputa (5 to 20 grains):—

℞ Potassii iodidi,	ʒiiss.
Tinct. lobeliæ,	fʒiv.
Spiritus ætheris comp.,	f℥ij.
Syrup. aurantii,	f℥iiss.

M. Sig.: From one to two teaspoonfuls in water every two or three hours until relieved. Serviceable in chronic bronchitis and in asthma.

In cardiac dropsy the iodide of sodium, alone or combined with digitalis and buchu, is often most beneficial in its effect. It can be prescribed thus:—

℞ Sodii iodidi,		ʒiv.
Infus. digitalis,		
Infus. buchu,	āā	f℥iij.

M. Sig.: Two teaspoonfuls every three or four hours.

In chronic bronchitis and in pleurisy, the following combinations are useful:—

℞ Potassii iodidi,		ʒiv.
Syr. ferri iodidi,		
Glycerini,	āā	f℥iss.

M. Sig.: A teaspoonful in water four times a day.

* See paper by the author on "The Cause and Treatment of Psoriasis," Transactions of the Pennsylvania State Medical Society, 1888.

℞ Potassii iodidi, ... gr. xxiv.
Potassii bromidi, ... ʒj.
Ammonii chloridi, ... ʒij.
Syr. yerbæ santæ,
Aquæ, ... āā f℥iss.

M. Sig.: A dessertspoonful every two to four hours, for cough with scanty expectoration.

Iodide of potassium may be combined with bromide of potassium for the treatment of epilepsy, as in Brown-Séquard's formula (page 484).

The tincture of iodine has been administered internally in 5- to 8-drop doses in the treatment of malarial affections; and the compound solution (Lugol's solution) is widely known as a remedy in scrofulous affections of the skin and of the lymphatic glands, especially in syphilitic children. The solution, with arsenic, is very serviceable in some old syphilitic skin diseases attended by thickening and scaling.

The iodide of zinc is in white, needle-shaped crystals, and is unstable. It is best administered as a syrup (ʒi–℥j); dose, ♏xx–xl. It has been used in ointment, with lard (10 per cent.), in the treatment of tumors, and a solution (gr. i–ij to f℥j) has been injected in gonorrhœa. Stronger solutions have been applied to enlarged tonsils.

Small and repeated doses of the iodide of ammonium are efficacious in catarrhal jaundice. Drop doses of the tincture of iodine will sometimes allay the vomiting of pregnancy. In the form of tincture, compound solution, or iodide of potassium, this agent has been employed in typhoid fever, and, though no marked influence is exerted upon the course of the disease, the temperature, or the diarrhœa, Liebermeister believes that it effects a notable reduction of the mortality. Bartholow's combination of the tincture of iodine and carbolic acid seems to moderate the severity of typhoid fever:—

℞ Tinct. iodi, ... fʒij.
Acidi carbolici, ... fʒj.

M. Sig.: One to three drops thrice daily.

Iodine has been made use of in exophthalmic goitre, but with doubtful results. Ringer states that "in some epidemics of diphtheria" the inhalation of the vapor of iodine proves of signal service, and Dr. S. N. Zènenko* has lately spoken very highly of the internal administration of the iodide of potassium in that affection. From ½ to 3 grains were given to children, 5 to 8 grains to adults, and repeated every second, third, or fourth hour. Antiseptic gargles, alcoholic stimulation, and inunction of the enlarged cervical glands with mercurial ointment were used in conjunction. Of a series of 21 patients so treated none died, while of 19 cases treated during the same time, in the same hospital (at Nijni Nov-

* Vratch, No. 42, 1890; Satellite, January, 1891.

gorod), after ordinary plans, 84 per cent. ended in death. The internal administration of the iodide of potassium will sometimes reduce enlargement of the mammary gland or testicle, and by some physicians is said to check the secretion of milk. Sciatica and lumbago are sometimes relieved by the same remedy. It is useful in the first stage of hepatic cirrhosis, in hypertrophic metritis, and in various syphilitic manifestations, especially when other remedies are not well borne by the stomach. Chronic urticaria has been successfully treated with iodide of potassium. Stern reported * 5 cases treated in this way. None were syphilitic, and all were rapidly cured. The itching was promptly relieved, and one patient became well after only 2½ drachms had been administered, although he had suffered previously for four months. Kobner administers an iodide-of-potassium combination by means of enema. Given once a day at first, but subsequently twice daily, the therapeutic action is said to be very rapid. He combines mercurial inunctions, and believes that this method is equally efficacious and better tolerated than subcutaneous injections. His formula is as follows :—

℞ Potassii iodidi, ...	gr. xlv.
Potassii bromidi, ...	gr. xv.
Extract. belladonnæ alc., ...	gr. v.
Aquæ, ...	f℥vij.—M.

Six drachms of this solution are added to 2 or 3 ounces of water and thrown into the rectum. Kobner frequently adds from 5 to 10 drops of pure tincture of iodine to each enema, and finds the mixture well tolerated by the large intestine. He has never observed any resulting local inflammation.

Hydriodic-acid syrup is a very pleasant and certainly an efficient way of giving iodine in chronic broncho-pulmonary affections. It should not be used if discolored; one of the best preparations is that made by R. W. Gardner, of New York, of unchangeable syrup of hydriodic acid. It renders excellent service in asthma, chronic induration of the lungs after pneumonia, pleuritic exudations, and in some skin diseases (page 374).

Dr. James Craig, of Jersey City, speaks very highly of the syrup of hydriodic acid in acute rheumatism. He gives from 2 to 3 drachms in a wineglassful of water every two or three hours until relief is experienced, afterward reducing the dose and continuing the remedy for several days if required. The pain and fever are reduced within forty-eight hours, and he believes that this treatment exerts an important influence in preventing cardiac complications. Its power over serous exudation and fibrous adhesive inflammation is well illustrated in pleurisy with large effusion, or in plastic pleurisy with adhesions. As the

* London Medical Recorder, November 20, 1890.

latter is a prominent predisposing cause of phthisis, it is important that it should receive attention early and be overcome by the administration of iodine, especially in the form of syrup of hydriodic acid. Wile has used this preparation with success in various forms of lead poisoning.

Aristol is a combination of iodine and thymol. A ready and cheap method of making it is that proposed by M. Boule,* by dissolving 3 parts each of crystallized thymol and caustic soda with 5.8 parts of iodide of potassium in 50 parts of distilled water by gentle heat. When cool, the solution is mixed with 250 parts of a concentrated solution of hydrochlorate of sodium and well shaken. Aristol is precipitated, and in about a quarter of an hour may be collected on a linen filter, washed with distilled water, and dried in the dark. (For properties and uses see page 452.)

Antiseptol, or **the iodosulphate of cinchonine,** is a new preparation of iodine intended as a substitute for iodoform or the more expensive aristol. It is obtained by adding to a solution of sulphate of cinchonine another solution containing iodide of potassium, with an excess of iodine; the iodine precipitates the alkaloid as a reddish-brown powder, insoluble in water, free from odor, and containing a large percentage of iodine. (See page 552.)

ICHTHYOL.—Icthyosulphate of Ammonium or Sodium.

Pharmacology.—A peculiar mineral deposit found in the Tyrol, of a bituminous character, yields, upon distillation, a tarry-looking substance called ichthyol, so named from the fact that the deposit appears to be the fossil remains of fishes. It is purified by distillation and with sulphuric acid. Ichthyol has a decided odor, which to some is very unpleasant; it is faintly alkaline, and contains 10 per cent. of sulphur in the form of a sulphur acid. It is soluble in a mixture of alcohol and ether, readily mixes with ointment and fats. It is generally used in a 10- to 20- per-cent. ointment.

Physiological Action and Therapy.—Ichthyol applied externally, as well as when administered, has similar action, in many respects, to sulphur and tar. The resin contained in ichthyol makes it exceedingly objectionable for external application on account of the sticky or gummy deposit left upon the skin. According to the experience of the author, ichthyol is irritating to the integument of many, and is poorly absorbed in the majority of cases. Ichthyol given internally has, in some instances in the writer's experience, occasioned more or less gastro-intestinal irritation, followed by diarrhœa. The free application of a 20-per-cent. ointment caused narcotism and stupor in a child, followed, however, by recovery. Unna considers ichthyol the best agent for treating certain

* Repertoire de Pharmacie, August 10, 1890, and Therapeutic Gazette, vol. xiv, p. 718.

chronic skin diseases, especially eczema and psoriasis. A 20-per-cent. ointment is sometimes useful in acute erysipelas, and also for the pain and swelling of the joints accompanying acute rheumatism. Ichthyol ointment has been employed in chronic eczema, acne, urticaria, lupus, and keloid. Dr. Agnew indorses its value in enlargement of lymphatic glands, and it acts well at times as an application in chilblains and burns.

In other conditions, accompanied by pain, as in acute sprains, the results of its use are sometimes satisfactory when applied with friction or massage. In uterine cancer, a 25-per-cent. ointment is said to relieve the pain and modify the course of the disease.

IPECACUANHA (U. S. P.).—**Ipecacuanha, Ipecac.**

Dose, gr. ss–j to xx, as an emetic.

Preparations.

Extractum Ipecacuanhæ Fluidum (U. S. P.).—Fluid Extract of Ipecac. *Dose*, ℳi–xxx.

Syrupus Ipecacuanhæ (U. S. P.).—Syrup of Ipecac (extract ipecac, 5 per cent.). *Dose*, f℥i–ij.

Vinum Ipecacuanhæ (U. S. P.).—Wine of Ipecac (extract 7 per cent.). *Dose*, ℳx–f℥j.

Trochisci Ipecacuanhæ (U. S. P.).—Troches of Ipecac (gr. $\frac{1}{4}$ in each). *Dose*, one or more.

Trochisci Morphinæ et Ipecacuanhæ (U. S. P.).—Troches of Morphine and of Ipecac (morphine, gr. $\frac{1}{40}$, and ipecac, gr. $\frac{1}{12}$, in each lozenge). *Dose*, one or more.

Pulvis Ipecacuanhæ et Opii (U. S. P.).—Powder of Ipecac and Opium (1 part each of opium and ipecac and 8 parts of sugar of milk). *Dose*, gr. ii–x.

Tinctura Ipecacuanhæ et Opii (U. S. P.).—Tincture of Ipecac and Opium (deodorized tincture of opium 100, fluid extract ipecac 10, alcohol q. s. to make 100 parts.). *Dose*, ℳi–xv.

Emetina.—Emetine, or Emetia. *Dose*, gr. $\frac{1}{120}$–$\frac{1}{4}$.

Pharmacology.—The Cephaëlis ipecacuanha of A. Richard (Rubiaceæ) is a small shrub of Brazil. The officinal portion is the root, which contains **Emetine,** a crystalline alkaloid, and **Ipecacuanhic acid,** a glucoside, with a trace of volatile oil, tannin, starch, gum, etc. The powdered root has a slight but characteristic and nauseous taste, which is not entirely covered in the officinal lozenges by the oil of gaultheria, added for this purpose, for which cinnamon or chocolate answers better.

Physiological Action.—The prolonged application of ipecac to the skin causes irritation, followed by vesicles, pustules, or even ulceration. Inhalation of the powdered root irritates the air-passages and occasions coryza, or, in some persons, an asthmatic attack. Taken into the mouth, it increases the salivary secretion and excites nausea; and, in the stomach, in a similar way, small doses (gr. $\frac{1}{4}$) promote secretion, while large ones cause nausea and vomiting. Ipecac is a systemic emetic and causes vomiting when swallowed, and also when injected hypodermatically in the form of fluid extract or the alkaloid, **Emetine.** This drug has a peculiar effect upon the pulmonary circulation, sometimes causing hyperæmia

and at others reducing the amount of blood in the lungs and producing relative anæmia. Small doses stimulate the liver, and larger ones, after tolerance has been established, act as cholagogue cathartics. The active principle is excreted by the liver and gastro-intestinal tract. The skin is relaxed and perspiration increased; the secretions of the broncho-pulmonary mucous membrane are also increased. No marked effect upon the circulation is noticed, but emetine exercises a solvent action upon the red corpuscles when injected into a vein. The pulse is reduced in tension as a result of the act of vomiting, which also favors diaphoresis.

Therapy.—Ipecacuanha has been used externally with benefit in insect-bites. Neal* recommends the following, especially in mosquito-bites:—

℞ Pulv. ipecacuanhæ, ... ʒss.
Spiriti vini rectificati,
Ætheris sulphuris, ... āā ℥ss.—M.

In the form of a spray with a hand-atomizer a dilute solution of the wine of ipecacuanha, as recommended by Murrell and Ringer, is of great service in emphysema, fibroid phthisis, chronic bronchitis, and winter cough, in allaying the spasmodic vomiting and liquefying the secretions. Ringer dilutes the wine with 1 or 2 parts of water, and, using an ordinary hand-atomizer, twenty or more squeezes of the bulb are made, and the spray deeply inhaled, once daily at first, afterward more frequently. The mouth should be well rinsed out afterward and a piece of lemon-peel chewed to avoid a nauseating effect. When fractional doses of wine of ipecac are administered (♏j every hour or half-hour) they may act as a stimulant and overcome obstinate vomiting and retching, just as small doses of brandy do. In the vomiting of pregnancy, it is said that a single drop taken every hour is curative; it certainly makes a decided mental impression, and also may overcome the morbid action of the stomach by substitution. Bartholow, however, declares that it has always failed in his hands, and that the statement is apocryphal. In hæmoptysis, small doses of the following combination have sometimes proved of service:—

℞ Pulveris ipecacuanhæ, ... gr. xij.
Bismuth. subnit., ... gr. xxiv.
Creasoti, ... ♏vj.
M. et ft. chartæ no. xij.
Sig.: A powder every hour or two until relieved of nausea or vomiting.

In hæmoptysis, small doses of the powder, short of producing vomiting, serve to reduce the bleeding by decreasing the pulmonary congestion. When, in bronchitis, the secretions are viscid and the cough hard, ipecac in combination with other expectorants is generally resorted to.

* New York Medical Times, January, 1891.

The appended formulæ containing ipecacuanha are to be recommended in bronchitis:—

℞ Vini ipecacuanhæ, ... f℥ij.
Syrup. scillæ, ... f℥ij.
Tinct. opii camph., ... f℥ss.
Glycerini, ... q. s. ad f℥v.
M. Sig.: One or two teaspoonfuls whenever necessary for the relief of cough.

℞ Syrup. ipecacuanhæ, ... f℥ss.
Ammonii chloridi, ... ʒij.
Spiritus ætheris nitrosi, ... f℥iss.
Morphinæ sulphatis, ... gr. j.
Syrup. pruni Virg., ... q. s. ad f℥v.
M. Sig.: Two teaspoonfuls every hour or two for the relief of cough.

For bronchitis, especially of elderly persons, ipecacuanha can be combined thus with advantage:—

℞ Syrup. ipecacuanhæ, ... f℥j.
Potassii nitratis, ... ʒij.
Creasoti, ... ♏v.
Glycerini,
Aquæ aurantii florum, ... āā f℥ij.
M. Sig.: Two teaspoonfuls in water every two or three hours.

In croup, especially where the mucus is not expelled, but is swallowed or accumulates in the air-passages, an emetic dose of syrup of ipecac often gives great relief and may prevent suffocation. For cases of this kind it is much superior to tartar emetic or the compound syrup of squill, also containing this salt, which is too depressing. In delirium tremens, or acute alcoholic poisoning, ipecac produces evacuation of the contents of the stomach and stimulates the action of the liver. It is too slow in its action as an emetic to be of much service in other forms of poisoning. In dysentery, 40 to 60 grains are given with wonderfully successful results; if necessary to quiet the stomach an opiate is administered about twenty minutes previously; no liquids swallowed for an hour after the ipecac has been taken, and absolute rest in the recumbent posture observed. The same treatment is useful in cholera morbus and, presumably, in Asiatic cholera. In dysenteric diarrhœa, when blood and mucus appear in the stools, small doses may be given, combined with opiates or Dover's powder. Ipecacuanha, with mercury and opium, often acts well in both diarrhœa and dysentery:—

℞ Pulveris ipecacuanhæ et opii, ... ʒj.
Pilulæ hydrargyri, ... gr. x.
Camphoræ,
Pulveris capsici,
Extracti kino, ... āā gr. xv.
M. et ft. pil. no. xxx.
Sig.: One or two pills every hour or two until relieved.

Ipecacuanha is also used in fractional doses for insufficient excretion of bile and torpor of the liver, and may be combined with a digitalis pill or other agents, as follows:—

℞ Pulv. ipecacuanhæ,	gr. iv.
Quininæ hydrochlorat.,	ʒj.
Pepsin.,	gr. xxiv.
Olei eucalypti,	♏iij.

M. et ft. pil. no. xxiv.
Sig.: Take one after meals.

When the tongue is heavily coated and the stomach contains indigestible food, especially at the beginning of a fever, an emetic dose of ipecac will prove very serviceable in relieving symptoms; it is a means of treatment that has been allowed to fall into undeserved neglect. In the treatment of malarial poisoning, this method of stimulating the liver is very useful previous to the administration of quinine or other antiperiodics.

In laryngismus stridulus, an emetic of syrup of ipecac usually aborts the paroxysm and affords time for the use of bromide of potassium to produce its effects. Trousseau recommended its use in the puerperal state, in cases of post-partum hæmorrhage, and dysentery, etc. In other forms of hæmorrhage, such as epistaxis, menorrhagia, and metrorrhagia, ipecacuanha is serviceable when given in doses sufficient to provoke vomiting. An attack of asthma may be cut short by full doses of ipecac, and an occasional emetic is useful in whooping-cough and capillary bronchitis to dislodge the secretions.

The **Euphorbia Ipecacuanha** (Euphorbiaceæ), Ipecacuanha spurge, growing in the eastern part of the United States, from New York southward, although belonging to a different natural order, yet contains in its root an emetico-cathartic principle, which renders it a good substitute for ipecac where emesis is required and catharsis is not objectionable. It is commonly administered in the form of powdered root, but a fluid extract may also be obtained. It is of more agreeable taste than ipecac. (See Euphorbium, page 621.)

IRIS FLORENTINA.—Orris-Root.

Pharmacology and Therapy.—Several species of the genus Iris (Iridaceæ) furnish the rhizome known by the name of orris-root. It contains a volatile oil of violet color and pleasant odor, much used in perfumery; besides an acrid resin, starch, mucilage, etc. The powder, which is said to be alterative, cathartic, and diuretic, is rarely employed internally, but is used in making sachets, tooth-powders, and in alcoholic tincture, in perfumery and flavoring extracts.

IRIS (U. S. P.).—**Iris, Blue Flag.**

Preparations.

Iridis Extractum (U. S. P.).—Extract of Iris. *Dose*, gr. ¼–j.
Iridis Extractum Fluidum (U. S. P.).—Fluid Extract of Iris. *Dose*, ♏xxx–f℥j.
Tinctura Iridis.—Tincture of Iris (saturated), made from fresh root. *Dose*, ♏x–f℥j.
Iridin.—An impure resin. *Dose*, gr. ss–iij.

Pharmacology.—The Iris versicolor (Iridaceæ) is a common inhabitant of moist places and borders of ponds, and is one of the most attractive among our wild flowers. It is a herbaceous perennial, with a thickened root-stock, which is the officinal portion—rhizome and rootlets. The flowers are large and showy, violet-blue, variegated with greenish-yellow and white, with purple veins; they appear in May and June. It contains an acrid resin, upon which its medicinal activity depends, besides ordinary vegetable principles. **Iridin** is an impure resin, precipitated from alcoholic tincture by water.

Physiological Action.—The powdered root, when fresh, is a powerful emetic and cathartic, less so after drying. It is a decided cholagogue, and also diuretic and alterative, having a stimulant action upon the intestinal glands. It is best given in combination with aromatics and milder purgatives.

Therapy.—In chronic hepatic derangements, especially of malarial origin, the preparations of iris are very useful, and particularly the recent saturated tincture. In duodenal catarrh, obstructive jaundice, bilious remittents, iris preparations are frequently used with advantage. In dropsy they are also useful, both as a diuretic and cathartic. Iris, administered in small doses, is very beneficial in sick-headache dependent upon indigestion. In larger doses it has vermifuge properties, and may be used to expel the round worm, **ascaris lumbricoides.**

℞ Ext. iridis fld.,
Ext. hydrastis fld., ... āā f℥ss.
Elixir. aromatic., ... f℥j.
M. Sig.: Take a dessertspoonful in hot water before meals for indigestion.

JABORANDI. See Pilocarpus.

JALAPA (U. S. P.).—**Jalap.**
Dose, gr. viii–xx.

Preparations.

Abstractum Jalapæ (U. S. P.).—Abstract of Jalap. *Dose*, gr. i–x.
Pulvis Jalapæ Compositus (U. S. P.).—Compound Powder of Jalap (jalap 35, cream of tartar 65 parts). *Dose*, gr. x–℥j.
Resina Jalapæ (U. S. P.).—Resin of Jalap. *Dose*, gr. i–iv.

Pharmacology.—The tuberous root of Exogonium purga (Convolvulaceæ), obtained from Mexico, contains from 12 to 18 per cent. of resin,

which is officinal and is composed of **Jalapin,** a soft resin soluble in ether, and **Convolvulin,** a hard resin insoluble in ether, the latter of which has been found to be the more active; also starch and sugar, of each about 18 per cent. The pharmacopœia requires that the root shall contain at least 12 per cent. of resin. The abstract of jalap, being a more uniform preparation than the extract, is now used in making the compound cathartic pills; it is about 20 per cent. stronger than the old extract of 1870, and is twice the strength of the crude drug.

Physiological Action.—Jalapin is a hydragogue cathartic, increasing the intestinal secretions and the flow of bile; overdoses may produce hypercatharsis and prostration. Convolvulin is an irritant, and may cause gastric enteritis and collapse; it is a local purgative, and is not excreted in the urine or fæces, but is probably destroyed by oxidation or by the hepatic cells.

Therapy.—The compound powder of jalap is one of the best hydragogue cathartics for dropsy either of heart or kidney disease; and in cases of pulmonary congestion and distended right heart, with lividity, shortness of breath, and so-called cardiac asthma, a teaspoonful of compound jalap-powder affords great relief. As an ordinary laxative it may be combined with compound liquorice-powder where the latter fails alone, and is a good cathartic for children. Jalap may be used as a cathartic after administration of santonin or calomel, or where a tæniacide has failed to bring away the parasite. As a purgative it is sometimes combined with calomel, but, as it acts more rapidly than the latter, the effect of the mercurial is lost unless it precedes the former from four to six hours. Jalap is not so rapid in its action as croton-oil, but is more manageable. In hæmorrhoids, it does not cause increased irritation, but relieves them by emptying the vessels above and clearing out the liver.

JAMBOL, or JAMBAL.

Pharmacology and Therapy.—The Syzygium jambolanum (Eugeniodeæ, Myrteæ) is a tree indigenous in tropical America and the West and East Indies, where the acid fruit is eaten as food and as a remedy for diarrhœa and diabetes by the natives. It has also been used to some extent in Europe in the form of an extract in the treatment of diabetes. In some experiments* made in Professor Binz's laboratory, it was shown by Dr. C. Graeser that in dogs in which diabetes had been artificially induced by the administration of phloridzin, the simultaneous exhibition of jambal reduced the proportion of sugar materially (80 to 85 per cent.). There were no signs of toxic action after administration of large doses, 6 to 18 grammes daily, of extracts partly made from the

* Lancet, November 2, 1889; Therapeutic Gazette, January, 1890.

whole fruit and partly from the rind or kernel. It is still uncertain whether the active principle is situated in the rind or the kernel; it probably exists in both, though more abundantly in the former. Mahomed has published notes of a case in which the use of jambal resulted in the diminution of the sugar in the urine and, at the end of a week, in its entire disappearance. On discontinuing the drug the sugar returned, and on resuming the jambal it again disappeared. It appears, however, to have been only a mild case.*

JEQUIRITY. See Abrus, page 355.

JUGLANS (U. S. P.).—**Butternut.**
Dose, ʒi–ij.

Preparations.

Extractum Juglandis (U. S. P.).—Extract of Butternut. *Dose*, gr. v–xxx.

Extractum Juglandis Fluidum (U. S. P.).—Fluid Extract of Butternut (alcoholic). *Dose*, fʒi–ij.

Pharmacology.—The inner bark of the Juglans cinerea (Juglandaceæ), a large tree of North America, collected in the autumn, contains **Nucin** or **Juglandic acid** (resembling crysophanic acid), also resin, volatile oil, and fixed oil and tannin.

Therapy.—It is a mild cathartic, useful in chronic constipation and dysentery.

Nut-oil is the fixed oil obtained by expression from the crushed seeds of several species of Juglandaceæ. Walnuts and hickory-nuts yield about 25 per cent. of a fine, bland, pleasant-tasting oil, which can be used in pharmacy, or in medicine for massage, like other fixed oils. It is a drying oil, containing linolein.†

JUNIPERUS (U. S. P.).—**Juniper, Juniper-Berries.**

Preparations.

Oleum Juniperi (U. S. P.).—Oil of Juniper. *Dose*, ♏v–xx.

Spiritus Juniperi (U. S. P.).—Spirit of Juniper (oil of juniper 3 and alcohol 97 parts). *Dose*, fʒj–℥j.

Spiritus Juniperi Compositus (U. S. P.).—Compound Spirit of Juniper (oil of juniper 10, oil of caroway 1, oil of fennel 1, alcohol and water q. s. ad 5000 parts). *Dose*, fʒii–iv.

Infusum Juniperi.—Infusion of Juniper-Berries (℥j to Oj). *Dose*, f℥ii–iv.

Extractum Juniperi Fructus Fluidum.—Fluid Extract of Juniper Berries (dilute alcohol). *Dose*, fʒss–iss.

Spiritus Genevæ.—Gin. *Dose*, fʒj–℥j.

Pharmacology.—The fruit of Juniperus communis (Coniferæ), an evergreen of this country and Northern Europe, contains from 2 to 2½ per cent. of a **volatile oil,** about 15 to 30 per cent. sugar, etc.; also a

* Practitioner, December, 1888.

† A Companion to the U. S. Pharmacopœia, Oldberg & Wall, New York, 1887.

non-crystallizable principle, **Juniperin.** The volatile oil also exists in the leaves and other parts of the plant, and by macerating them in alcohol or spirits a liquor is produced, commonly known as gin, or spiritus Genevæ. As the commercial article is frequently adulterated with oil of turpentine and other ingredients known to the trade, the pharmacopœia offers a substitute in the compound spirit of juniper. The oil of juniper obtained from the wood is inferior to that distilled from the berries, which is the officinal form from which the spirit and compound spirit are made.

Physiological Action.—Juniper stimulates the kidneys, but in health, while the discharge of urea is increased, the urinary water is actually diminished temporarily; an overdose may produce strangury and suppression of urine. In diseased conditions, however, the flow of urine is much more free, and especially where dropsy exists. The oil is carminative as well as diuretic, and in alcoholic solution is a frequently-used stimulant. It is contra-indicated in acute inflammation of the kidneys.

Therapy.—In various forms of dropsies juniper is useful. In the form of an infusion, to which ½ ounce of cream of tartar is a good addition, a pint being drunk through the day, the effects are soon manifest in Bright's disease and its attendant œdema and effusions. A combination with the acetate of potassium is also very effective, as—

℞ Potassii acetatis, ...	ʒvj.
Spiritus juniperi comp., ...	f℥iss.
Infusi scoparii, ...	f℥ivss.

M. et ft. sol.
Sig.: A tablespoonful three or four times a day.

Juniper gives relief in passive congestion of the kidneys and the lumbar pain which accompanies that condition. This remedy is inappropriate, however, in acute nephritis on account of its stimulant properties. In large doses it sometimes excites priapism, strangury, or hæmaturia. Benefit is obtained from juniper in chronic pyelitis, prostatorrhœa, and gleet. The juice of the berries has been successfully used in doses of two or three teaspoonfuls as a diuretic for young children and in renal dropsy. The oil may be dropped in boiling water and inhaled to produce the same effect. In infantile colic a few drops of the compound spirit in hot water relieves flatulence and pain.

Oleum Cadini, the oil of cade, is obtained by the destructive distillation of juniper-wood; it is tarry and empyreumatic, and is useful as a stimulant application in chronic eczema and in psoriasis. In the latter malady, after the scales have been removed, Hebra's modification of Wilkinson's ointment often proves of considerable efficacy. The formula is as follows:—

℞ Sulphuris sublimati,
Olei cadini, ... āā ℥ss.
Saponis viridis,
Adipis, ... āā ℥j.
Cretæ preparatæ, ... ʒiiss.
M. et ft. ungt.

KAMALA (U. S. P.).—**Kamala, Rottlera** (Ph., 1870).

Pharmacology and Therapy.—The glands and hairs from the capsules of Mallotus philippinensis (Euphorbiaceæ), a small tree of India and China, are used, mixed with molasses or other vehicle, as a vermicide. It also possesses purgative properties. For tape-worm from 1 to 2 drachms are given at a dose, with a little hyoscyamus to prevent griping. An ethereal extract deposits crystals of what is called **Rottlerin.** A fluid extract (not officinal) is also used to expel lumbricoid worms. In the form of ointment, kamala is used in the East in the treatment of scabies and ring-worm.

KAVA-KAVA.—Ava-kava, Methysticum.

Dose, ♏xv–ʒss; best in the form of a fluid extract.

Pharmacology.—The Piper methysticum (Piperaceæ) is a shrub of the Sandwich Islands, having a large root, which yields about 2½ per cent. of soft **resin** (consisting of two kinds, distinguished as **a** and **b**), about 1 per cent. of a neutral, crystalline principle, **methisticin** (or kavahin), and some yellow volatile oil. This resembles piperine and cubebin, and is probably inert, the medicinal qualities depending upon the resins and volatile oil. It is best given in the form of a tincture or fluid extract made with alcohol as a menstruum.

Physiological Action.—In the Sandwich Islands the natives prepare an intoxicating beverage by chewing the root and infusing it with water or cocoanut-milk to grace their festivals. The fluid extract is diuretic and depressant. The peculiar effects of this drug do not seem to be entirely due to either of the resins which it contains, but no other active principle has yet been isolated.

The physiological action of kava-kava has been investigated by Lewin, Randolph, and others, and quite recently Dr. David Cerna has published an account of a series of experiments* upon the same subject. When the fluid extract or the resin is placed upon the tongue a burning sensation is at first produced, soon followed by an increase of saliva and local anæsthesia. The loss of sensation endures for hours and normal sensibility slowly returns. The same benumbing influence is exercised upon the cornea and conjunctiva by a local application. The mucous membrane is rendered anæmic. Taken internally in considerable quantity,

* Therapeutic Gazette, January 15, 1891.

it induces somnolence. As the result of his researches, Cerna concludes that kava-kava produces general anæsthesia, and is especially a powerful local anæsthetic. It diminishes and finally destroys the action of the afferent nerves by affecting their peripheral ends. Reflex action is diminished and ultimately abolished. Paralysis of spinal origin is an effect of the drug. The action of the heart is rendered slower and more powerful; arterial pressure is at first reduced and subsequently raised. Respiration is at first stimulated, afterward depressed, and finally paralyzed. Small doses of kava-kava slightly increase, while large quantities reduce, bodily temperature.

Therapy.—In cystitis and chronic gonorrhœa, kava-kava is often remarkably successful. It has also been recommended for gout. It is suggested that the anæsthetic properties of this substance may prove useful to dentists, and that, though irritant to the conjunctiva, it may be employed subsequent to cocaine for the purpose of prolonging the anæsthesia due to the alkaloid, and may be used, also, to disguise the taste of bitter or nauseous medicines.

KINO (U. S. P.).—**Kino.**
Dose, gr. x–xx.

Preparations.

Tinctura Kino (U. S. P.)—Tincture of Kino (10 per cent.). *Dose*, f℥i–ij.

Extractum Kino Liquidum.—Liquid Extract of Kino (about 50 per cent.). *Dose*, ♏xv–xxx.

Pharmacology.—Kino is the inspissated juice of Pterocarpus marsupium (Leguminosæ), a tree of the East Indies. It occurs in fragments of a ruby-red color, without odor, of a sweetish, astringent taste; scarcely soluble in cold, but entirely soluble in boiling water; soluble also in alkalies. **Kinotannic acid** is the most important constituent; there are also present **Kinoin,** a crystalline neutral substance, **Pyrocatechin, Pectin,** etc. The officinal kino is the so-called Malabar kino; there are other varieties, notably one from Botany Bay, obtained from several species of eucalyptus.

Physiological Action and Therapy.—Kino is a mild astringent, useful in diarrhœa, especially with chalk mixture and paregoric. Kino, locally and internally, possesses some value as a hæmostatic, and is a serviceable remedy in pyrosis. The tincture is often an ingredient of injections in gonorrhœa, and may be applied as a stimulant dressing to chronic ulcers. The compound powder (Ph. Br.) is used for the same purpose (it contains kino 15, cinnamon 4, opium 1). It has 5 per cent. of opium, and is used in doses of 5 to 20 grains. Kino may also be employed as a gargle, but has no advantage over tannic acid for this purpose.

KOLA-NUT.

Dose, gr. v–ʒij, in the form of a paste.

Pharmacology.—The seeds of Sterculia acuminata (Sterculiaceæ) are used by the natives in various parts of Africa for the purpose of increasing bodily force and restoring impaired energy. The seeds are chewed, and from the powdered dried seeds an agreeable stimulant and nutritious beverage is prepared with milk and honey. The tree grows to the height of 30 to 60 feet, bears some resemblance to the horse-chestnut, is a native of the western coast of Africa, and is found as far inland as 500 or 600 miles. It has been introduced, and with success, into other tropical regions of Asia and South America. From 5 to 15 seeds, some red and others white, are contained in a single capsule. They contain a large proportion of caffeine or theine (2.348 per cent.), together with tannic acid and theobromine (0.023 per cent.), other constituents being sugar, albumin, cellulose, starch, fat, and fixed salts. These seeds have lately been employed in a number of clinical experiments. An alcoholic extract has been made by exhausting the fresh nuts with 5 parts of 60° alcohol and a wine by macerating in a sweet white wine for a fortnight. But neither of these preparations extract all the caffeine. A tincture and a syrup have also been made, though water is an imperfect menstruum on account of the starch contained in the seeds. According to Simmonds* there is also a false or bitter kola, the male kola, named also the Garcinia kola, the seeds of which are oval or cuneiform; these are four in number, contained in a large berry. The false kola-nuts are destitute of alkaloid.

Physiological Action.—The taste of the fresh seeds is at first sweet, becoming astringent and finally bitter. From his investigations upon himself and others, R. H. Firth concludes that kola increases the secretion of urine, stimulates the nervous system and heart, and increases arterial tension. It prevents the feeling of exhaustion from exercise or hunger. It communicates an agreeable taste to water or food, and, according to Armitrous, renders tainted meat edible and clarifies polluted water by a mechanical action.

Therapy.—Kola exercises a preservative action upon the teeth and gums and promotes appetite and digestion. It favorably modifies the functions of the liver. It is, therefore, adapted to act as a remedy in dyspepsia, whether of gastric or hepatic origin. Its combined stomachic and astringent properties render it of service in the treatment of acute and chronic diarrhœa. In its native country it is thought to protect Europeans against affections of the liver, and the natives esteem it as a prophylactic against dysentery. It has been proposed as likely to be of service in cholera. As a heart-stimulant, it may be employed in weak-

* Pharmaceutical Record, January 5, 1891.

ened conditions of that organ, in fever, and in phthisis. Its favorable influence upon the nervous system suggests its employment in neuralgia. It is stated that kola has a remarkable power of promoting cheerfulness, and may be very serviceably used in hypochondria and melancholia. It is probably of value in overcoming the taste for alcoholic liquors. Simmonds states that the false kola-seeds, when chewed, are an effectual remedy for cold in the head.

KRAMERIA (U. S. P.).—**Krameria, Rhatany.**
Dose, gr. v–xx.

Preparations.

Extractum Krameriæ (U. S. P.).—Extract of Krameria. *Dose*, gr. i–x.
Extractum Krameriæ Fluidum (U. S. P.).—Fluid Extract of Krameria. *Dose*, ♏i–xx
Syrupus Krameriæ (U. S. P.)—Syrup of Krameria (35 per cent.). *Dose*, f℥i–iv.
Tinctura Krameriæ (U. S. P.).—Tincture of Krameria (20 per cent.). *Dose*, f℥i–iv.
Trochisci Krameriæ (U. S. P.).—Troches of Krameria (each, gr. j of extract). *Dose*, one or more.

Pharmacology.—Krameria is the root of Krameria triandra and of K. tomentosa (Polygalaceæ), growing in South America. It contains about 20 per cent. of **Kramerio-tannic acid,** which is the active constituent. The infusion (℥i to Oj) and an abstract, though not officinal, are useful preparations.

Physiological Action.—It is a powerful astringent.

Therapy.—In Peru it is largely used as a remedy for bowel disorders, diarrhœa, dysentery, etc. The infusion is a satisfactory gargle for relaxed throat, and the lozenge is also used for this purpose. The tincture of krameria may be combined with chalk mixture in the treatment of summer diarrhœa. Krameria is employed as a systemic remedy in epistaxis, hæmatemesis, hæmaturia, and other forms of hæmorrhage. It is of service, both locally and internally, in hæmorrhoids and leucorrhœa, and the tincture or the fluid extract is used, diluted and in combination with other astringents, as an injection, in gonorrhœa. A mixture of the decoction and the tincture was recommended by Trousseau as an injection in fissure of the anus. The powdered extract enters into the composition of many tooth-powders.

KUMYSS.—**Koumiss, Milk-Wine.**

Pharmacology.—Originally made in Asia by the Tartars as an intoxicating drink by fermenting mares' milk, kumyss has been introduced into European medicine as a food and as a remedial agent. It can be made for medical use by adding a small piece of compressed yeast to diluted cows' milk containing a small amount of grape-sugar; it should be kept in a cool place, with frequent agitation, and used on the fourth or fifth day.

The late Prof. S. W. Gross (College and Clinical Record) gave the following simple directions for preparing kumyss:—

Dissolve ½ ounce of grape sugar in 4 ounces of water. Dissolve 20 grains of yeast-cake in 4 ounces of milk. Pour both into a quart bottle and fill nearly to the top with milk. Cork tightly, fastening the cork with wire. Put into a cool place and shake two or three times daily for three days. *Keep for use no longer than six days.*

A champagne-tap introduced through the cork is necessary. Kumyss contains about 16 per cent. of alcohol, and is a pleasant, acidulous drink.

Physiological Action and Therapy.—The combined action of the carbonic acid and alcohol in kumyss produces an exhilarant impression. It raises the arterial tension and assists in assimilation. It adds tone to the stomach, aids the appetite, excites the action of the kidneys and skin, and favors sleep. Kumyss, by reason of its utility as a nutriment during inflammatory action, is of great service in phthisis, scrofula, chronic bronchitis, and in the treatment of surgical cases. In an irritable stomach it is a most beneficial remedy in its sedative and nutritive effect.

In the nausea and vomiting of pregnancy, owing to the action just referred to, kumyss very often acts in a most happy manner, the nutrition and bodily vigor of patients being increased by the continued use of kumyss during this period. At the time of confinement, when nausea and vomiting supervenes, followed by exhaustion, kumyss will often assist in restoring the flagging powers. During the state of lactation kumyss will be very grateful, will assist the nutrition of the system, and will be productive of better and more nourishing milk. In convalescence from acute diseases, in diarrhœa and dysentery, kumyss will be serviceable to feeble digestion, and will aid in assimilation. In cholera infantum, gastro-intestinal diseases of childhood, and in fevers, kumyss is a most agreeable form of food. It is also an admirable remedy and food in acute and chronic alcoholism, in albuminuria, diabetes, gastralgia, gastric ulcer, and in the various forms of cancer and dyspepsia. Kumyss is especially useful in cachexia of kidney disease (f℥iv four or five times a day).

The amount of kumyss administered to each case should vary according to the disease. In some instances from 1 to 4 ounces can be given every one to three hours; in others as much as a good-sized glassful or two can be taken frequently during the day and night. The writer has administered as much as three or four quarts of kumyss a day in diseases attended with much exhaustion, and often with decidedly good effect.

LACTUCARIUM (U. S. P.).—**Lactucarium, Lettuce-Opium.**
Dose, gr. x–xx.

Preparations.

Extractum Lactucarii Fluidum (U. S. P.).—Fluid Extract of Lactucarium. *Dose,* variable. ♏i–iij for a child, ♏x–f℥j for an adult.
Syrupus Lactucarii (U. S. P.).—Syrup of Lactucarium. *Dose,* f℥i–℥iss.
Glyceritum Lactucarii.—Glycerite of Lactucarium. *Dose,* f℥ii–iij.

Pharmacology.—The concrete milk-juice of Lactuca virosa (Compositæ), a wild variety of lettuce growing in Europe, but also found in garden-lettuce, Lactuca sativa. The only important constituent is the mixed substance, **Lactucarium,** obtained by evaporation of the milky juice. It is in flattened pieces or cakes, of reddish-brown color, internally white or waxy-looking, of heavy, opium-like odor, and a bitter taste. It is administered in 10-grain doses. French lactucarium, being simply a blackish-brown extract of lettuce, is inferior to that of the pharmacopœias of the United States and England, which is made from the expressed juice. Lactucarium consists of **Lactucerin, Lactucin,** and **Lactucic acid.** The syrup is pleasant to the taste; a glycerite may be made of the same strength as the syrup, but using glycerin instead of simple syrup.

Physiological Action.—It is a feeble narcotic, and owes its reputation largely to the observation that eating lettuce causes drowsiness. Its preparations vary greatly in activity, but are not toxic, and are therefore much safer for children than those of opium. Some action upon the kidneys is also observed, and it allays spasmodic cough.

Therapy.—The syrup is used in cough mixtures for children, Aubergier's syrup having the reputation of being active and uniform in strength. To allay nervous irritability, and as a substitute for the soothing syrups containing morphine, it has decided value. The fluid extract may be used in elderly persons, or where there is an idiosyncrasy against opium, to fulfill the same ends.

LAMINARIA.—Laminaria, Sea-tangle.

Pharmacology and Therapy.—The small stems of the Laminaria digitata (Algæ), when dried, are cut into appropriate lengths and shape and their surface made smooth, to be used as substitutes for sponge tents in dilating the cervix uteri, owing to their property, when moistened, of swelling up to several times their original size.

LANOLINUM.*—Lanolin, Wool Fat.

Pharmacology.—In the washings of wool is found a variety of fat which, owing to the presence of cholesterin, combines readily with more

* For further observation on lanolin see author's work on Ointments and Oleates, Especially in Diseases of the Skin, second edition, pp. 14 to 24. F. A. Davis, Philadelphia and London, 1890.

than its own weight of water; it does not become rancid and resists saponification. It is neutral and is a good vehicle for remedies to be used by inunction, as it passes readily through the skin; it is not adapted as a protective for the same reason. The sheepy smell of the fat is removed by repeated washings, and pure lanolin is now obtainable that is nearly odorless.

Physiological Action.—Lanolin has a soothing action on a delicate or irritable skin. It is not used internally, but only as an unguent.

Therapy.—In psoriasis and in chronic eczema with infiltration, lanolin softens the skin and favors the action of remedies combined with it. It is a good vehicle for the anodynes,—atropine, cocaine, morphine, veratrine, etc.,—in cases of neuralgia or rheumatic joints. As an ointment alone for the eye, lanolin is too thick, tenacious, and sticky, and to remedy these defects Prof. P. D. Keyser uses a combination of 1 part of benzoated lard to 3 parts of lanolin, which makes a fine, smooth ointment; he has found it the best vehicle for eye ointments, and, even alone, is often used to apply at night to the eyelids in conjunctivitis and almost all external inflammations.

LAPPA (U. S. P.)—Burdock-Root.

Pharmacology.—The seeds (achenes) and root of Lappa officinalis (Compositæ) contain a bitter principle, volatile oil, resin, mucilage, sugar, a little tannin, etc. The root is used for similar purposes to those of sarsaparilla. A fluid extract of the seeds (dose, ♏xv–f℥j) and a tincture of the seeds (1 pound to 1 gallon) are employed, also an infusion or decoction of the seeds or root, but none of the preparations are officinal.

Physiological Action and Therapy.—Burdock is diaphoretic, diuretic, and laxative, without causing irritation. The fluid extract is used externally for swellings, hæmorrhoids, ulcers, etc., and internally for rheumatism, syphilis, and chronic skin diseases.

According to Squibb, the tincture* is a useful tonic and is curative in psoriasis.

LAUROCERASUS.—Cherry-Laurel.

Preparation.

Aqua Laurocerasi.—Cherry-Laurel Water. *Dose*, f℥ss–ij.

Pharmacology.—The fresh leaves of Prunus laurocerasus (Rosaceæ) contain **Laurocerasin,** a compound of amygdalin and **amygdalic acid,** and also **Emulsin,** which, when in the presence of water, form a volatile oil (benzaldehyde) and hydrocyanic acid, to which it owes its medicinal qualities. Cherry-laurel water is distilled from the fresh leaves, bruised

* Ephemeris, vol. i, p. 116.

and macerated in water; it contains the volatile oil and hydrocyanic acid, but is of uncertain strength.

Therapy.—It is used in Europe (very rarely in this country except by foreign physicians) for the same purposes as bitter-almond water and chiefly as a vehicle for anodyne and antispasmodic remedies. A cherry-laurel ointment, consisting of 1 part of essence of cherry laurel to 8 parts of lard, is used in Italy in painful affections, as neuralgia, herpes zoster, chronic rheumatism, and carcinoma.

LAURUS.—Laurel, Bay, or Bay-Laurel.

Preparation.

Unguentum Lauri.—Laurel Ointment (suet 350 parts, rectified oil of amber 20, oil of turpentine 45, and expressed oil of bay-berries 585 parts).

Pharmacology.—The leaves and berries (Lauri folia and Lauri baccæ) of Laurus nobilis (Lauraceæ), a tree of Southern Europe, contain volatile oil, **Laurin**, or laurel-camphor, a liquid fixed oil, a solid fixed oil known as **Laurostearin**, and starch. The volatile oil of laurel-berries, consisting of a camphene and eugenic acid, is occasionally employed externally in rheumatism. By boiling the fresh fruit in water and using pressure, the expressed oil of laurel is obtained, which is used in the form of ointment as an anodyne. Leaves, berries, and oil are stimulant and narcotic. A laurel ointment is officinal in the French Codex. It is composed of 1 part each of fresh laurel-leaves and laurel-berries, with 2 parts of lard. This preparation is applicable to erythema, dermatitis, erysipelas, acute eczema, and superficial burns. The leaves are used in cooking for flavoring (bay leaves, bay-laurel leaves); they should not be confounded with the leaves of **Myrcia acris**, from which the volatile oil of bay is distilled, that is used as a perfume (and enters into spiritus myrciæ, or bay-rum), or **Myricæ Cerifera Cortex,**—bay-berry bark.

LAVANDULA (U. S. P.).—Lavender, Lavender Flowers.

Preparations.

Oleum Lavandulæ (U. S. P.).—Oil of Lavender. *Dose,* ♏iii–v.

Oleum Lavandulæ Florum (U. S. P.).—Oil of Lavender Flowers. *Dose,* ♏iii–v.

Spiritus Lavandulæ (U. S. P.).—Spirit of Lavender (oil of lavender flowers 30, alcohol 970 parts). *Dose,* f℥ss–j.

Tinctura Lavandulæ Composita (U. S. P.).—Compound Tincture (formerly Spirit) of Lavender (oil of lavender 8, oil of rosemary 2, cinnamon 18, cloves 4, nutmeg 10, red saunders 8, in dilute alcohol, q. s. ad 1000 parts). *Dose,* f℥ss–j.

Pharmacology.—The flowers of Lavandula vera (Labiatæ), much cultivated in England for their perfume, are officinal. They contain volatile oil, some resin, and tannin. The oil of lavender, distilled from the whole herb or flowering tops, is coarser than that distilled from the flowers

alone; of the latter there are several varieties, differing in value and fineness. An inferior, greenish, turpentine-like oil, distilled from Lavandula spica, is known as oil of spike-lavender. The oil of lavender has the property of checking decomposition. The compound tincture is an elegant preparation of aromatics and stimulants.

Lavender is carminative and stimulant. It is useful in flatulence, nervous dyspepsia, gastralgia, colalgia, hysteria, and syncope. It is used in perfumery, and enters into spiritus odoratus, vinum aromaticum, liquor potassii arsenitis, and spiritus ammoniæ aromaticus.

LEDUM.—Ledum, Wild Rosemary.

Dose, gr. xv–xxx.

Pharmacology and Therapy.—The small twigs, tops with undeveloped flowers and leaves of Ledum palustre (Ericaceæ), but **without** the fruit even partly formed, contain volatile oil, **Valerianic acid, Ericolein, Leditannic acid,** resin, etc., and are used in infusion, as marsh-tea. Ledum is said to be somewhat narcotic, astringent, and tonic; it is used externally to destroy parasites, and internally in diarrhœa and dysentery, gout, rheumatism, and chronic skin diseases.

LEONURUS.—Leonurus, Motherwort.

Dose, f℥i–ij, in fluid extract.

Pharmacology and Therapy.—The flowering tops and leaves of Leonurus cardiaca (Labiatæ) contain a bitter principle, some volatile oil, etc. It is used in recent infusion, and, as a fluid extract, with dilute alcohol, as a menstruum to promote the menstrual discharge and in suppression of the lochia. It is also deemed useful in hysterical pains.

LEPTANDRA (U. S. P.).—**Leptandra, Veronica, Culver's Root.**

Dose, gr. xx.

Preparations.

Extractum Leptandræ (U. S. P.).—Extract of Leptandra. *Dose,* gr. iii–x.

Extractum Leptandræ Fluidum (U. S. P.).—Fluid Extract of Leptandra. *Dose,* f℥ss–j.

Pharmacology.—The rhizome and rootlets of Leptandra Virginica (Scrophulariaceæ) contain a bitter principle, **Leptandrin;** also saponin, tannin, resin, starch, etc. What is ordinarily designated leptandrin is merely an impure resin or alcoholic extract. Leptandra is common in woods from Vermont to Wisconsin and southward.

Physiological Action.—Leptandra-root, or Culver's physic, is a cholagogue cathartic. It should be dried, for in its recent condition it acts too violently to be used. The extract is an eligible form in which to use the drug, which, in small doses, is tonic and laxative.

Therapy.—In indigestion, with deficiency of secretions and constipation, leptandra has been found useful, and may be combined with podo-

phyllum, which it resembles in its effects, or with aromatics. When the stools are clay-colored and show a deficiency of bile, this agent may be used to bring about bilious discharges, even when there is diarrhœa.

LIMON.—Lemon.

Preparations.

Limonis Cortex (U. S. P.).—Lemon-Peel. The rind of the recent fruit of Citrus limonum (Aurantiaceæ).

Limonis Succus (U. S. P.).—Lemon-Juice. The freshly-expressed juice of the ripe fruit of Citrus limonum.

Preparations from the Cortex, or Rind.

Oleum Limonis (U. S. P.).—Oil of Lemon. Used for flavoring.
Spiritus Limonis (U. S. P.).—Spirit of Lemon. Used for flavoring.
Syrupus Limonis (U. S. P.).—Syrup of Lemon. Used for flavoring.

Preparations from the Juice.

Mistura Potassii Citratis (U. S. P.).—Neutral Mixture. *Dose*, f℥ii–iv.
Syrupus Acidi Citrici (U. S. P.).—Syrup of Citric Acid. As a vehicle. *Dose*, f℥i–ij.
Acidum Citricum (U. S. P.).—Citric Acid. *Dose*, gr. v–xxx.
Syrupus Limonis.—Lemon Syrup. Contains both juice and rind. *Dose*, f℥i–℥ss.

Pharmacology.—Lemons, owing to their pleasant flavor and agreeable acidity, are very useful in the sick-room. The rind is glandulous, and by expression yields an oil of great fragrancy, much superior to that obtained by distillation. Each lemon yields from 2 to 8 drachms of acidulous juice, containing citric acid (7 to 9 per cent.), besides phosphoric and malic acids, in combination partly with potassa and other bases. A solution of citric acid in water (gr. xxxiv to ℥j) corresponds in acidity with fresh lemon-juice, but not therapeutically on account of absence of other constituents. Half an ounce of lemon-juice should neutralize 25 grains of potassium bicarbonate, 20 of sodium bicarbonate, or 14 of ammonium carbonate. Lime-juice, obtained from a smaller fruit of the same genus (Citrus acris), closely resembles fresh lemon-juice, but acquires a peculiar, slightly musty taste from the wood in which it is imported. When fresh the rind of lemon, besides the oil above mentioned, contains a bitter, crystalline glucoside, **Hesperidin.** When preserved, boiled in syrup and dried (candied), lemon-peel is useful in flavoring, for cooking, etc.

Therapy.—Lemon-juice is applied to the surface of the skin to remove freckles or ephelides, moth-spots, sunburn, pruritus, and ink-stains. Used internally, lemon or lime-juice is antiscorbutic, probably owing to the presence of phosphoric acid or potash salts, as citric acid does not possess this property. It is now so constant a companion of voyagers by sea that scurvy is rarely seen, except where the regular ration of lemon- or lime-juice has been neglected. It is also curative in scurvy, and in various scorbutic manifestations upon the skin, or in the form of muscu-

lar pains. In some cases of chronic rheumatism, the administration of several ounces of lemon-juice daily affords marked relief. Lemon-juice has been likewise used in acute rheumatism with, at times, apparent good results. Lemonade, made by diluting lemon-juice with water and adding sugar, is a useful drink during convalescence; it increases the urinary water and reduces the acidity of the urine. Hot lemonade is useful as a diaphoretic in recent colds; its effects are increased by the addition of a little whisky or gin. Neutral mixture, made by neutralizing fresh lemon-juice by the addition of crystals of bicarbonate of potassium, is useful as a refrigerant and to satisfy thirst in fevers. Atheromatous changes in the arteries are retarded by the persistent use of lemon-juice, which is also useful in obesity. In Italy, an infusion of the lemon, the rind being incised to allow the juice to escape, is administered in ague and other malarial attacks attended by fever.

LINDERÆ CORTEX.—Lindera-Bark, Spicebush-Bark.

Dose, ♏xxx–f℥j, in fluid extract.

Pharmacology.—The Benzoin odoriferum (Lauraceæ), Lindera benzoin, or spicebush, is one of our common forest shrubs, belonging to the same natural order as the sassafras, the cinnamon, and the camphor tree. The bark and fruit contain a volatile oil, resin, and the common vegetable principles. The bark has a pleasant, spicy taste, due to the oil.

Physiological Action.—It is aromatic, stimulant, and tonic, and a recent, hot, weak infusion is diaphoretic.

Therapy.—In some disorders of digestion the carminative and tonic effects are available; the infusion is used in chills and to abort a cold. A decoction of the inner bark made into an ointment with cold cream is recommended by Hyde as a valuable remedy in rhus poisoning.

LINUM (U. S. P.).—**Linseed, Flaxseed.**

Preparation.

Oleum Lini (U. S. P.).—Linseed-Oil.

Pharmacology and Therapy.—Flaxseed (Linum usitatissimum; natural order, Linaceæ) contains mucilage and linolein. It is demulcent and emollient. A hot infusion (℥ss–Oj), flavored with liquorice-root or lemon-peel, is used in bronchial inflammations, as a diaphoretic and expectorant; also in cystitis, strangury, and hæmaturia. A plain infusion is an excellent enema for use in inflammation of the rectum, fissure, hæmorrhoids, etc. Ground flaxseed mixed with boiling water forms flaxseed poultice, which is spread at least half an inch in thickness upon muslin or flannel, and applied as hot as possible in order to relieve pain and congestion in peritonitis, and in pneumonia, pleurisy, etc., as jacket poultices, renewed every two to three hours. They should be covered with

oiled silk to retain heat and moisture, and, if desired to increase the counter-irritant effect, a little dry mustard or a few drops of turpentine may be sprinkled over the surface. They afford great relief to the patient. Laudanum, also, or lead-water and laudanum, are often used with a flaxseed poultice in inflammatory and painful affections. Flaxseed poultices are also applied to boils and abscesses to abort the process or to hasten ripening. They are also applied occasionally to ulcers and wounds to encourage granulations and bring about healthy action. Whole flaxseed, in ½-ounce doses, has been ordered in habitual constipation as a laxative.

The long-continued application of poultices is likely to bring out an eruption of small boils upon the skin, the result of hyperæmia and irritation. Poultices are often useful for temporary purposes, but too long applied are mischievous. The integument and the vessels subjected to their influence become relaxed, suppuration is prolonged, granulations rendered unhealthy, and the repair of ulcer or wounds retarded.

Oil of flaxseed is an old application to burns to exclude the air; combined with lime-water, it forms Carron-oil, which was formerly used largely for this purpose, having been originally used at an iron works of that name in Scotland, where the workmen were frequently burned. It is dirty and soon smells badly, and has been driven out of use by petrolatum and Listerism.

LIPPIA MEXICANA.

Pharmacology.—Lippia Mexicana (Verbenaceæ), a creeping, evergreen shrub, with very long roots and numerous branches, grows abundantly in Southern Mexico. Its medicinal virtues reside in the leaves and stalks, especially in the leaves, which possess an agreeable, sweetish, and aromatic taste. The plant contains a small proportion of tannic acid, an ethereal oil, and a volatile camphor termed **Lippiol.** A fluid extract and a tincture have been prepared, the dose of the former being from 5 to 30 minims, and of the latter from ½ to 1 fluidrachm.

Physiological Action.—Lippia causes a sensation of warmth in the stomach, and in large doses may give rise to vomiting. This is succeeded by free perspiration and sleepiness.

Therapy.—The drug is endowed with valuable expectorant properties. It allays irritation of the bronchial mucous membrane and promotes healthy secretion. Its effects are rapidly manifested. Lippia is useful in both acute and chronic bronchitis. In the former it allays the cough, and in the latter it liquefies the viscid secretion and facilitates expectoration. It is of service in the cough of phthisis, has an excellent effect in irritative cough, and in whooping-cough mitigates the paroxysms,

though it is not able to shorten the course of the disease. It has, in some instances, proved useful in spasmodic asthma.

LIQUIDAMBAR.—Liquidambar, Sweet Gum.

Pharmacology.—The Liquidambar styraciflua (Hamamelaceæ) of North and Central America supplies a brownish-yellow balsam, resembling storax, and containing stryrol (3½ per cent.), cinnamic acid (5 per cent.), styracin, and resin. A good substitute for the imported drugs which it resembles,—storax, tolu, and benzoin,—and used for the same purposes.

LITHIUM.

Salts.

Lithii Benzoas (U. S. P.).—Benzoate of Lithium. *Dose*, gr. v–xx.
Lithii Bromidum (U. S. P.).—Bromide of Lithium. *Dose*, gr. v–xx.
Lithii Carbonas (U. S. P.).—Carbonate of Lithium. *Dose*, gr. v–xx.
Lithii Citras (U. S. P.).—Citrate of Lithium. *Dose*, gr. v–xx.
Lithii Salicylas (U. S. P.).—Salycilate of Lithium. *Dose*, gr. v–xx.
Lithii Iodidum.—Iodide of Lithium. *Dose*, gr. i–v.
Lithii Guaiacas.—Guaiacate of Lithium. *Dose*, i–v.

Pharmacology.—Lithium is a metal of an alkali, generally prepared from the native silicate, or **Lipidolite.** It decomposes water at ordinary temperatures, but without melting like sodium, and is less easily oxidized than either sodium or potassium. The metal, which is not officinal, resembles tin. It was first obtained by Bunsen by electrolysis of the chloride. Its salts are soluble in water, but the carbonate and phosphate only slightly so.

Physiological Action.—The urate of lithium is freely soluble, and therefore when lithium, in combination with the vegetable acids, is administered, these salts are decomposed in the system and the lithium combines with uric acid, renders it soluble, and thus facilitates its expulsion from the body. These salts are also diuretic, and the administration of lithium produces an increase in the urinary secretion. The carbonate of lithium promotes the assimilation and metabolism of nitrogenous material and increases the elimination of urea. Some mineral waters largely owe their medicinal effects to the small proportion of these salts which they contain, being rendered more effective by natural combination with other salts.

Therapy.—In the uric-acid diathesis, the several salts of lithium are used with great advantage, even where chalky deposits exist. It has been also stated that they can dissolve uric-acid calculi in the urinary passages or bladder. Where there is vesical catarrh and alkaline urine, the benzoate is the best salt to use, since it renders the urine more acid; where the urine is already too acid the other officinal salts are preferable. In gouty subjects, especially those suffering with indigestion, lithium

renders good service, and can be given in the form of an effervescent salt or in Vichy water. In gravel, lithium affords prompt relief.

The salts of lithium have likewise been advantageously employed in chronic articular and muscular rheumatism. In rheumatoid arthritis they sometimes seem to delay the progress of the malady. In gout, subacute and chronic rheumatism, as well as in irritable bladder from excess of acid and in uric-acid calculi, lithium may be given thus:—

℞ Lithii citratis, ... ʒiss.
Liquor. ammonii acetatis,
Syrupi limonis, ... āā f℥ij.

M. Sig.: Two teaspoonfuls in water every two or three hours for rheumatism and gout.

℞ Lithii iodidi, ... ʒj.
Syrup. sarsaparillæ comp., ... f℥v.

M. Sig.: A half to a tablespoonful three or four times a day for syphilis.

℞ Lithii guaiacat.,
Quininæ sulphatis, ... āā gr. xl.

M. et ft. capsulæ no. xij.

Sig.: A capsule or two every two or three hours for rheumatism and gout.

℞ Lithii bromidi, ... ʒiiss.
Tinct. cardamom. comp., ... f℥j.
Glycerini, ... f℥iij.

M. Sig.: Two teaspoonfuls in water every hour or two hours for rheumatism and gout.

℞ Lithii benzoat., ... ʒij.
Tinct. belladonnæ, ... ♏lxxij.
Extracti tritici repentis fl., ... f℥iij.

M. Sig.: A teaspoonful every two or three hours for irritable bladder, depending on excess of acid, and in uric-acid calculi.

In glycosuria, the combination of arsenic with a lithia-water has been vaunted as curative. The bromide of lithium has been found beneficial in epilepsy by Weir Mitchell, who states that it will in some cases succeed after failure of the bromide of potassium or sodium. The lithium should always be administered in a large excess of water, and distilled water is better for this purpose on account of its diuretic properties. The Hygeia lithia-water is a definite solution of lithium in distilled water, and is more reliable than many of the commercial, natural lithia-waters. The iodide of lithium contains a large proportion of iodine, and is a good method of administering this remedy, the only objection being its high cost. Woodbury* recommends the administration of a solution of iodide of lithium by electricity, or the cataphoric action of the galvanic current in tubercular syphilides and other local inflammatory exudations and infiltration, and suggests its application in cancer.

* Transactions of the College of Physicians of Philadelphia, 1890, and Medical News.

LITMUS.

Pharmacology.—A blue pigment from Rocella tinctoria (Lichenes), imparting its blue coloring-matter, **Orcein,** to water and alcohol. Paper stained with a solution changes its color to red in the presence of an acid; the blue color is restored by plunging the paper in an alkaline solution. Hence we have blue and red test-papers for acids and for alkalies.

LOBELIA (U. S. P.).—**Lobelia.**

Dose, gr. viii–xx, as an emetic.

Preparations.

Acetum Lobeliæ (U. S P.).—Vinegar of Lobelia (10 per cent.). *Dose,* ♏x–fʒj.
Tinctura Lobeliæ (U. S. P.).—Tincture of Lobelia (20 per cent.). *Dose,* ♏v–fʒj.
Extractum Lobeliæ Fluidum (U. S. P.).—Fluid Extract of Lobelia. *Dose,* ♏i–x.
Lobeline.—Impure Alcoholic Extract. *Dose,* gr. ss–j.

Pharmacology.—Lobelia consists of the leaves and tops of Lobelia inflata (Lobeliaceæ) collected after a portion of the capsules have become inflated. It is a small herb, common by the waysides, with alternate leaves, an erect, hairy stem, with blue flowers in the axils of the leaves. The herb has a slight odor and a burning, tobacco-like taste. The chief constituent is a liquid alkaloid, **Lobeline,** combined with **Lobelic acid** and **Lobelacrin.** It forms crystallizable salts. The seeds contain about 30 per cent. of oil. The preparation sold as lobelin is an impure resin or powdered extract.

Physiological Action.—Lobelia has no local action, but there is some danger that it may be absorbed and produce systemic effects if applied too freely to the skin. Internally, it is a powerful depressant in large doses, and sialagogue, expectorant, emetic, and purgative, according to circumstances. This drug frequently produces headache and vertigo, and may cause death from exhaustion, or by paralysis of the respiratory centre. It depresses the circulation and action of the heart, favors diaphoresis through the violent emesis which it causes, and also lowers temperature. Lobelia also promotes the discharge of urine and has some narcotic properties.

Should alarming symptoms follow an overdose of lobelia the proper treatment consists in washing out the stomach with a solution of tannic acid, the external application of heat, hypodermatic injection of alcohol, ether, ammonia, or strychnine. Subsequently, moderate doses of opium will allay vomiting.

Therapy.—An infusion of lobelia (1 ounce to the pint) has been used as a lotion in dermatitis due to rhus toxicodendron. It has valuable antispasmodic powers, though it is generally employed in too small doses in asthma. Ringer administers a drachm of the tincture every hour, or 10 minims every ten minutes, immediately at the onset of a paroxysm of

asthma with marked benefit in shortening the attack. Lobelia may be employed thus for asthma:—

℞ Tinct. lobeliæ, ... f℥j.
Tinct. hyoscyami, ... f℥ss.
Aquæ camphoræ,
Spiritus ætheris nitrosi, ... āā f℥j.
Syrupi pruni Virg., ... f℥ss.
M. Sig.: A teaspoonful in water every half-hour or hour until relieved.

℞ Acetum lobeliæ, ... f℥ss.
Sodii bromidi, ... ʒv.
Syrup. ipecacuanhæ, ... f℥ss.
Glycerini, ... f℥iv.
M. Sig.: Two teaspoonfuls every one or two hours.

Lobelia should not be employed as an emetic, as it produced too much nausea and depression, and when so used has caused death. For the same reason lobelia is detrimental when dyspnœa is occasioned by disease of the heart. The spasmodic stage of whooping-cough is often ameliorated and shortened by the exhibition of this remedy. It is, relatively, better tolerated by children than by adults. On account of its expectorant properties, lobelia is of service in bronchitis, especially when the mucus is dry, the cough hard and barking, or the expectoration is extremely tough and hard to raise. In the treatment of whooping-cough and bronchitis, lobelia may be administered as follows:—

℞ Tinct. lobeliæ, ... fʒij.
Sodii bromidi, ... ʒiij.
Spiritus ætheris nitrosi, ... f℥j.
Syrup. limonis, ... q. s. ad f℥iij.
M. Sig.: A half to a teaspoonful every one or two hours to a child for whooping-cough.

℞ Tinct. lobeliæ, ... f℥ss.
Ammonii iodidi, ... ʒij.
Spiritus ætheris comp., ... f℥ij.
Syrup. tolutani, ... f℥iiss.
M. Sig.: Two teaspoonfuls every two or three hours for bronchitis.

In constipation and impaction, the tincture of lobelia in 1-minim doses every hour promotes peristalsis and stimulates intestinal secretions; or a 10-drop dose may be given at bed-time, acting in a similar way to tobacco:—

℞ Acetanilid., ... ʒij.
Tinct. lobeliæ, ... fʒij.
Syr. eriodictyi aromat., ... q. s. ad f℥iij.
M. Sig.: Take a teaspoonful every quarter of an hour during attack of asthma until relieved.

LUPULINUM (U. S. P.).—**Lupulin.**

Pharmacology.—The glandular powder separated from the strobiles of Humulus lupulus (Urticaceæ), or hops. (See Humulus, page 660.)

LYCOPERDON.—Puff-Ball. Lycoperdon solidum or giganteum (Fungi) in powder is hæmostatic. It is credited with narcotic properties, but has been occasionally used for food.

LYCOPODIUM (U. S. P.).—**Lycopodium.**

Pharmacology.—The sporules of Lycopodium clavatum and of other species of lycopodium (Lycopodiaceæ); they contain nearly 50 per cent. of oil.

Physiological Action.—Lycopodium, given internally, had been said in the past to have diuretic and antispasmodic action. Merrell ("Digest of Materia Medica") states* that the eclectics claim that lycopodium acts as a stimulant to the sympathetic visceral nerves, and therefore is of value in functional diseases of the organs under their control. Greene believes that lycopodium stimulates the liver, thus lessening the work of the kidneys, and that it has an anæsthetic effect upon the mucous membranes.

Therapy.—Lycopodium is a bland powder, and, if not contaminated by fraudulent addition of starch, is an excellent dusting-powder for intertrigo, or to prevent excoriations, especially in infants.

A tincture of lycopodium has been made by subjecting the powder to prolonged trituration with sugar of milk, after which it readily dissolves in alcohol. This preparation, in ½-drachm doses, is commended by Hurry Fenwick and others as of value in incontinence of urine among adults. Greene states that flatulent dyspepsia, attended by a copious deposit of uric acid in the urine, is markedly benefited by this tincture.†

Lycopodium has also been employed for the treatment of rheumatism, dyspepsia, pulmonary and renal diseases. Sectarian physicians use it triturated with sugar of milk in minute doses for affections of the mucous tract, particularly dyspepsia, pyrosis, ileo-colitis, and for diseases of the urinary organs.

LYCOPUS.—Bugle-Weed.

Dose, f℥i–iv, in infusion or fluid extract.

Pharmacology.—The Lycopus Virginicus (Labiatæ) is a small herb common in wet places, resembling the mints, but wanting their aroma. The whole herb is used in decoction or infusion, but a fluid extract is the most eligible form in which to give it. It contains a volatile oil, with a little resin and tannin.

Physiological Action and Therapy.—Bugle-weed is astringent and sedative. It has been used in pulmonary disorders and phthisis to allay fever, cough, and expectoration. It reduces the force and frequency

* The Medical Standard, Chicago, January, 1891.

† British Medical Journal, November 29, 1890.

of the heart's action, and acts as a sedative, and in large doses is depressant to the nervous system. By virtue of the volatile oil it is somewhat carminative, and in small doses is considered tonic. It has been used in organic and functional heart disease, and in exophthalmus by Dr. Hector.* It is of service in spasmodic cough in combination with belladonna, but is rarely used. Probably when its composition and physiological properties are better understood, it may be better appreciated.

MACIS (U. S. P.).—**Mace.**

The arillus of Myristica fragrans (Myristicaceæ) is used principally for flavoring purposes. (See Myristica.)

MAGNESIUM.

Salts and Preparations.

Magnesia (U. S. P.).—Light Magnesia, Calcined Magnesia. *Dose*, ʒi–iv.

Magnesia Ponderosa (U. S. P.).—Heavy Magnesia. *Dose*, ʒss–iv.

Magnesii Carbonas (U. S. P.).—Carbonate of Magnesium. *Dose*, ʒss–ij.

Magnesii Sulphas (U. S. P.).—Sulphate of Magnesium, Epsom Salts. *Dose*, ʒj–℥j.

Magnesii Sulphis (U. S. P.).—Sulphite of Magnesium. *Dose*, gr. xv–xxx.

Trochisci Magnesiæ (U. S. P.).—Troches of Magnesia (each containing gr. iii). *Dose*, two or more.

Liquor Magnesii Citratis (U. S. P.).—Solution of Citrate of Magnesia (dispensed in bottles containing 1 pint, effervescing when opened). *Dose*, f℥iv–xvj.

Mistura Magnesiæ et Asafœtidæ (U. S. P.).—Mixture of Magnesia and Asafetida† (magnes. carb. 5, tr. asafœtida 7, tinct. of opium 1, sugar 16, water q. s. ad. 100 parts). *Dose*, fʒss–j.

Magnesii Citras Granulatus (U. S. P.).—Granulated Citrate of Magnesia. *Dose*, ʒi–iv.

Ferri Oxidum Hydratum cum Magnesia (U. S. P.).—See Iron, page 626.

Pulvis Rhei Compositus (U. S. P.).—See Rhubarb.

Pharmacology.—Magnesium is a light, silver-like metal, which, rolled in thin plates or ribbons, can be ignited, and will burn with a brilliant, white flame, forming a white smoke of the oxide. The carbonate of magnesia is of two varieties, one heavier than the other; by calcination in a crucible they yield the two forms of oxide of magnesia and heavy magnesia. The carbonate and oxides of magnesia are white in color, alkaline, insoluble, and tasteless, or nearly so. The sulphate is in colorless crystals, of a bitter taste, and quite soluble in water; it occurs native, and is a constituent of sea-water. It enters into the compound infusion of senna. The sulphite is a white, crystalline powder, obtained from the preceding, of slightly bitter taste, soluble in 20 parts of water. It oxidizes upon exposure to the air.

Physiological Action.—Magnesia (or calcined magnesia, as it is commonly called) and the carbonate have a slightly astringent effect upon the skin. When taken into the stomach, they are antacid and laxative.

* Chicago Medical Times, June, 1889.

† This is known as Dewees' Carminative; a similar preparation, Dalby's Carminative, contains 1⅙ grains of opium in each ounce.

It may be used as an antidote to acids, and also in poisoning by phosphorus, copper, or arsenic; for the latter an officinal combination with hydrated sesquioxide of iron is provided. The citrate and sulphate are saline cathartics; the latter has no cholagogue effect, as was formerly thought, but it is a powerful irritant to the intestinal glands.

Therapy.—The carbonate of magnesia, which comes in small cubes, is used to dry the skin and prevent chafing or excoriation. Internally it is an antacid for indigestion, heart-burn and pyrosis, and is used as a laxative for infants. Sick headache, dependent upon gastric acidity, is often relieved by the administration of carbonate of magnesium. Magnesia ponderosa is a convenient form in which to administer the oxide; it may be given suspended in orange-juice or milk. Magnesia has been used with variable success in sympathetic vomiting and the vomiting of pregnancy. It is of service in neutralizing uric acid, and may, therefore, be employed in lithiasis, though inferior in this condition to lithium. In adults, if constantly administered, it may form large concretions in the intestines. The citrate is more purgative, and, in the officinal effervescent salt and solution, is a pleasant cathartic for simple evacuation of the bowels. The sulphate is more active, causing free watery discharges. It may be given in repeated small doses, every hour, in order to overcome fæcal impaction; also in the constipation of lead poisoning:—

℞ Magnesii sulphatis, ... ʒij.
Morphinæ sulphatis, ... gr. j.
Aquæ menthæ piperitæ, ... f℥iij.

M. Sig.: A tablespoonful every two hours in lead colic.

Dr. Matthew Hay advocates the use of magnesium sulphate in the treatment of pleural and other serous infusions, administering 1 or 2 ounces at a dose and restricting the fluids drunk. The citrate and sulphate cause little, if any, irritation, and may safely be used in enteritis or in peritonitis to keep the bowels open. In many acute febrile disorders small doses of these salines are beneficial, and in atonic conditions they may be combined with iron. The purgative mineral waters, Friedrichshall, Pullna, Seidlitz, Hunjadi Janos, owe their property principally to the sulphate of magnesia. The bitter taste of the Epsom salt is covered by adding some coffee to its solution. It is the cathartic to administer in cases of the peculiar diarrhœa caused by impacted masses of fæces in the colon, and in dysentery it proves very serviceable associated with aromatic sulphuric acid and laudanum. In acute dysentery magnesium sulphate sometimes acts remarkably well, often removing fever, the blood and mucus from the stools, together with the tenesmus.

Dr. A. W. D. Leahy, who has treated 95 cases of acute dysentery

with magnesium sulphate, with only 2 deaths, recommends the remedy, combined as follows: "Take a sufficient quantity of sulphate of magnesia to saturate 7 fluidounces of water, and to this solution add 1 ounce of diluted sulphuric acid. The dose of this is a tablespoonful every hour or two in a wineglassful of water until it operates. Sulphate of morphine may be added, or starch enemata with laudanum may be employed."* In anæmia and chlorosis, which Clarke attributes to fæcal intoxication, the following combination forms a useful tonic laxative; it is known as **Mistura ferro-salina**:—

℞ Magnesii sulphatis,	℥j.
Potassii bitartratis,	ʒj.
Ferri sulphat. exsiccat.,	gr. x.
Aquæ,	Oij.

M. Sig.: A wineglassful half an hour before breakfast each morning.

Where a more decided purgative effect is desired, the remedies should be given in more concentrated form, thus: equal parts of Rochelle and Epsom salts may be taken, say, each a teaspoonful, dissolved in a small quantity of water. The sulphite of magnesium has been recommended as a remedy for infectious dyspepsia and inflammatory or febrile diseases of infectious origin. A sulpho-carbolate has likewise been introduced to fulfill the same indications. The sulphate and carbonate of magnesium are said to be serviceable given internally for the treatment of warts.

The carminative mixture of magnesia and asafœtida (U. S. P.) should be used with care in infants on account of the opium which it contains.

MAGNOLIA (U. S. P.).—Magnolia.

Dose, ♏xxx–fʒj of a fluid extract.

Pharmacology.—The bark of Magnolia glauca, M. acuminata, and M. tripetala (Magnoliaceæ), all indigenous trees of our Eastern and Southern States. The drug contains, besides resin and tannin, a bitter, crystallizable, neutral principle, **Magnolin**, soluble in alcohol, but not in water. A fluid extract made with alcohol is the best preparation.

Physiological Action.—An aromatic bitter, which can be used in appropriate dose as a tonic or as an antiperiodic. Diaphoretic properties are also ascribed to magnolia.

Therapy.—Magnolia is used in debilitated conditions of the system attending malarial attacks, rheumatism, etc. In intermittent fevers it has been used successfully as a substitute for quinine.

MAIDIS STIGMATA.—Corn-Silk.

Preparations.

Extractum Stigmatorum Maidis Fluidum.—Fluid Extract of Corn-Silk. *Dose,* fʒi–ij.
Vinum Stigmatorum Maidis.—Wine of Corn-Silk. *Dose,* f℥ss–j.
Syrupus Stigmatorum Maidis.—Syrup of Corn-Silk. *Dose,* f℥ss–j.

* London Lancet, October 4, 1890.

Pharmacology.—The green pistils (Stigmata Maidis, corn-silk) of Zea Mays, Linné (Gramineæ), maize, or Indian corn, gathered when the tassel has shed its pollen, are said to contain an active principle which is termed **Maizenic acid.** The plant is too well known to need any description. A native of America, it has been extensively cultivated in all temperate climates.

Physiological Action and Therapy.—The preparations of corn-silk are palatable and well tolerated by the stomach. Its principal action is as a diuretic, and it likewise seems to exert a sedative action upon the urinary passages. When œdema is associated with an enfeebled condition of the heart, corn-silk, by exciting diuresis, acts indirectly as a heart-tonic; the pulse becomes regular and increases in force, while arterial tension is raised. Corn-silk is of service in congestion of the kidney, chronic nephritis and pyelitis. During its administration albuminuria is lessened and the excretion of urea is augmented. It also answers a good purpose in suppression of urine. In lithiasis, renal colic, and hæmaturia corn-silk has been found of benefit. Irritability of the bladder, acute and chronic cystitis (especially the latter), retention of urine, and prostatitis are ameliorated by this remedy. According to Dufau it is contra-indicated in acute traumatic cystitis and gonorrhœal cystitis, increasing the pain of the malady. Other observers, however, report good results from its use in cystitis dependent upon gonorrhœa or stricture. Some, after having thoroughly washed out the bladder, employ the fluid extract of corn-silk diluted with water, as an injection, with asserted good results. Others speak favorably of its use as an internal remedy in acute gonorrhœa. It has been given with success in nocturnal incontinence of urine. In œdema of the lower extremities, associated with disease of the heart and in general dropsy from heart or kidney disease, corn-silk is serviceable alone or combined thus:—

℞ Extracti stigmatorum maidis fl., ... f℥iss.
Extracti taraxaci fl.,
Infusi digitalis, ... āā f℥iij.

M. Sig.: Two teaspoonfuls in water every three or four hours.

℞ Extracti stigmatorum maidis fl., ... f℥ij.
Potassii bitartratis, ... ʒiij.
Spiritus ætheris nitrosi, ... f℥ij.

M. Sig.: A half a tablespoonful every two or three hours.

MAIDIS USTILAGO (U. S. P.).—Corn-Smut.

Preparation.

Extractum Ustilaginis Fluidum.—Fluid Extract of Ustilago. *Dose*, ♏x–fʒj.

Pharmacology and Therapy.—Ustilago, or corn-smut, is a fungus resembling ergot, growing upon all parts of the Zea Mays. It should be

preserved in a dry state, and should not be kept longer than a year. Corn-smut contains about 5 per cent. of an amorphous, reddish-brown substance resembling sclerotic acid. The fluid extract is used in a similar manner to ergot, in order to stimulate the contractions of the uterus during and after labor. The usual dose is about 30 grains, or 15 to 75 minims of a fluid extract.

MALTUM (U. S. P.)—**Malt.**

Preparations.

Extractum Malti (U. S. P.).—Extract of Malt. *Dose*, f℥i–iv.

Extractum Malti Diastasicum.—Diastasic Extract of Malt. *Dose*, f℥j–℥ij.

Pharmacology.—Malt is the seed of Hordeum distichum (Graminaceæ) caused to enter the incipient stage of germination by artificial means and dried. Extract of malt is made with water at a moderate heat and evaporated by means of a vacuum apparatus to the consistency of thick honey. The method adopted in making the "diastasic" extract of malt, the author is informed by Mr. Louis Genois, a Philadelphia chemist, who prepares an admirable form of it, is to macerate well-malted barley in warm water for several hours, until the starchy matter has been changed to dextrine and maltose; the infusion is then simmered with fresh hops at a temperature under 160° F., in order to retain the diastase and other albuminoids unimpaired, and the resulting liquid subjected to fermentation until the percentage of extractive matter amounts to about 12 per cent., and that of alcohol to about 4 per cent. This takes from seventy-five to one hundred days.

When properly made, the extract and diastasic extract of malt not only contain all the nutritive substances of malted barley, but also a peculiar ferment (diastase), which has the power of converting starch to the soluble form, thus assisting in the digestion of amylaceous food.

The liquid malt extract, resembling honey in density, is a good vehicle for iron, the hypophosphites, quinine, etc.

Therapy.—Extract of malt is a valuable food, in concentrated form, and easily assimilated. It is pleasant to the taste, can be eaten upon bread or mixed with milk, and agrees with the digestive organs. It forms, with an equal quantity of good codliver-oil, an emulsion which children readily take, and which is useful in convalescence or wasting diseases. The water may be entirely extracted in the vacuum apparatus, giving us dry extract of malt, which is the basis of some largely-used food preparations for young children and invalids. The other form of liquid malt just referred to is made by fermentation, and several varieties of this malt are sold, varying in alcoholic strength from the smallest traces to 8 or 10 per cent., making, in fact, a beer. A good liquid malt is a valuable remedy in cases of general debility, deficient digestive

power, or loss of appetite. It is probably one of the best agents for increasing muscular tissue and augmenting fat; many persons gain considerable weight from a malt course. The use of malt liquors has been already referred to under the head of alcohol.

MANACA.

Dose, ℳ v–xx, in fluid extract.

Pharmacology.—Brunfelsia hopeana (Scrophulariaceæ), Manaca or Mercurio vegetal is a Brazilian shrub, the root of which possesses medicinal virtues. The bark of the root, when reduced to powder, has a yellowish-brown color and an odor which recalls that of corn-meal. An energetic alkaloid, difficult to isolate in a state of purity, has been discovered by Dragendorff. Manaca is officinal in the Brazilian dispensatories, the dose of the powdered root being given as 8 to 20 grains. In this country a fluid extract has been made and may be given in doses of 5 to 20 minims.

Physiological Action.—According to the investigations of Dr. E. P. Brewer,* of Norwich, Conn., manaca has no influence upon the brain or special senses, but stimulates the motor centres of the spinal cord, and in full doses abolishes the reflex function of the cord. It depresses the cardiac and respiratory reflex centres and stimulates the glands, especially the salivary, gastric, intestinal, and cutaneous; also the liver and kidneys. Signs that its physiological action is produced are, in man, a feeling of band-like constriction around the head, nausea, and profuse perspiration. When these symptoms manifest themselves the remedy should be suspended or reduced in quantity. In its home, manaca is regarded as purgative, diuretic, and emmenagogue; also antisyphilitic and antirheumatic. In small doses it is resolvent, in large doses an acrid poison.

Therapy.—Manaca has been principally used as a remedy in rheumatism. In the acute form of this disease, the articular pain and swelling not infrequently subside rapidly after the development of the physiological effects of the drug. In a considerable proportion of cases, chronic rheumatism is notably ameliorated by the administration of manaca. In muscular rheumatism this drug is likewise serviceable and may be profitably combined with the iodide of potassium and cimicifuga, as in the following prescription :—

℞ Potassii iodidi, ...		ʒiss.
Extract. cimicifugæ fl.,		
Extract. manacæ fl., ...	āā	fʒiss.
Syrup. sarsaparillæ comp., ...	q. s. ad	f℥iv.

M. Sig.: A tablespoonful four times a day.

* Therapeutic Gazette, 1882, p. 326.

In neuralgia of rheumatic origin, manaca may sometimes be used with advantage. In scrofulous manifestations and in secondary syphilis, it has been administered with asserted good effects. From its action upon the secretions, Dr. Brewer infers that it might be of benefit in gastric and gastro-duodenal catarrh, and jaundice dependent upon the latter condition, as well as in simple jaundice due to inaction of the liver.

MANGANUM.—Manganese.

Preparations.

Mangani Oxidum Nigrum (U. S. P.).—Black Oxide of Manganese. *Dose*, gr. ii–x.
Mangani Sulphas (U. S. P.).—Sulphate of Manganese. *Dose*, gr. ii–v.
Potassii Permanganas (U. S. P.).—Permanganate of Potassium. *Dose*, gr. ss–j.

Pharmacology.—Manganese is whitish gray, very hard and almost as infusible as platinum, but in the metallic state is not used in medicine or surgery. It exists in small quantity in the blood and bile, in company with iron. The binoxide or black oxide, treated with hydrochloric acid, yields manganous chloride, water, and chlorine, and is sometimes used to obtain chlorine in the sick-room. When heated with chlorate of potassium it undergoes no change, but favors the steady evolution of oxygen-gas from the potassium salt, and this method is generally followed for the production of oxygen on a small scale for laboratory purposes.

Physiological Action.—The sulphate is an emetic and purgative in doses of 1 or 2 drachms, and has decided cholagogue properties; in smaller doses it may be used as a hepatic stimulant. Overdoses of manganese salts, especially if long continued, depress the system, lower the heart-action, favor fatty degeneration of the muscles and of the liver, and reduce blood-pressure. Excessive doses occasion gastro-enteritis. These salts are intestinal irritants, and the black oxide has emmenagogue properties. Small doses favor hæmatosis, acting like iron, as a tonic. The permanganate of potassium is an oxidizing agent and a generator of ozone; it is a valuable antiseptic and disinfectant. In the stomach it arrests fermentation, but probably is at once decomposed, so that it is not absorbed into the circulation in its own form; but it, nevertheless, does exercise some systemic effect and is considered a good emmenagogue.

Therapy.—In solution, gr. i–v to each ounce of water, or even more dilute, the permanganate is useful as a deodorant to foul wounds, compound fractures, and ulcers; it is also injected into the nose in ozæna, or used as a mouth-wash in diphtheria, scarlatina, necrosis of jaw, cancer of the tongue, and conditions causing foul breath. In bromidrosis (fetid perspiration) of the feet, sponging with permanganate solution and the use of a drying powder of starch and salicylic acid will often correct the condition. Injections of permanganate are sometimes slightly irritating, or even caustic, and they should not be used in gunshot wounds of the

abdomen or abscesses connected with the peritoneal cavity, for fear of injurious consequences. In treating purulent discharges from the external ear the permanganate is thought to favor perforation of the tympanic membrane, and if used at all here it should be in very dilute solution. In the strength of 2 grains to the ounce, permanganate has been used with success as an injection in gonorrhœa and leucorrhœa. An ointment containing the oxide of manganese has been used in tinea, scabies, and porrigo. M. Galewouski, of Paris, reports good results from the use of baths of permanganate of potash in the treatment of small-pox. In the treatment of disorders of the uterine functions many practitioners speak highly of the manganese salts, especially when the trouble is due to functional and not to any mechanical or obstructive cause. Dr. John N. Upshur, of Richmond, Va., reports* especially good results in membranous dysmenorrhœa from the use of the oxide (gr. ij each) in gelatin-coated pills, given four or five times daily. The permanganate is often not well borne by the stomach. The oxide of manganese is also of service in amenorrhœa, or sudden suppression of the menses as a result of cold, and when the menstrual discharge is scanty and irregular. Manganese is useful in anæmia and chlorosis, particularly when given in conjunction with iron :—

℞ Potassii permanganatis, ... gr. v.
Mass. ferri carbonatis,
Quininæ sulphatis, ... āā gr. x.
M. et ft. pil. no. x.
Sig.: A pill three or four times a day.

An unofficinal syrup of the iodide of iron and manganese is a good alterative tonic in scrofula and the debility due to prolonged suppuration. The oxide, in doses of 10 or 15 grains, is recommended by Dr. Leared in gastrodynia and pyrosis. The same preparation relieves catarrhal or malarial jaundice, especially when combined as follows :—

℞ Mangani oxidi nig., ... ʒss.
Resinæ podophylli, ... gr. ij.
Extract. belladonnæ alc., ... gr. j.
M. et ft. capsulæ no. x.
Sig.: A capsule three or four times a day, in catarrhal jaundice.

The permanganate is of avail in flatulent dyspepsia and lithiasis. It has occasionally produced good results in acute rheumatism, and has been employed, with varying success, in a number of infectious disorders, as scarlet fever, diphtheria, erysipelas, septicæmia and pyæmia. In the first two named, this remedy, in solution, is applied to the throat with advantage. It is also recommended, locally and internally, in snake-bites. The sulphate of manganese has been used in chronic rheumatism and neuralgia, but with doubtful results.

* Transactions of the Ninth International Congress, Washington, 1887, vol. iii, p. 71.

MANGOSTANA.—Mangosteen.

Pharmacology.—The rind of the fruit of the mango, or Garcinia mangostana (Guttiferæ), growing in India, contains tannin and a bitter, crystallizable principle, **Mangostin.** The fruit is about the size of a small orange; the rind is hard, dark brown, smooth, inodorous, with bitter, astringent taste.

Therapy.—Used in diarrhœa and dysentery; also in the form of decoction, as an astringent, in sore throat, nasal catarrh, leucorrhœa, etc. A fluid extract of mango (dose, f℥ss–j), made from the bark of Mangifera Indica, of the same natural order as the preceding, has very much the same properties and is used for the same purposes. It is also recommended as a hæmostatic.

MANNA (U. S. P.).—**Manna.**

Dose, ℥j.

Pharmacology.—Manna is the concrete saccharine exudation of the Fraxinus ornus (Oleaceæ), or manna-ash of Italy, Sicily and Asia Minor; also growing elsewhere, but yielding manna only in southern climates. Other sources of manna exist, as the tamarisk, oak and larch, and a small, leguminous plant of India (Alhagi manna); but neither of these is of any importance compared with that derived from the flowering ash-tree, which is the universally-known manna, both commercially and medicinally. It contains **Mannite** (70 to 80 per cent.), a sugar-like substance, and traces of **Fraxin,** a neutral, bitter substance found in the bark of several species of ash; also glucose, resin, mucilage, etc. The flake-manna is the selected, homogeneous, clear masses; manna, in sorts, contains more or less foreign material, such as straw, chips, etc. The best sort is scarce and expensive. There are no officinal preparations, except that manna is a constituent of compound infusion of senna (U. S. P.), or black draught, which a former generation of physicians especially favored (consisting of senna 6, manna 12, magnesium sulphate 12, fennel 2, boiling water q. s. ad 100 parts.)

Therapy.—Manna is laxative in doses of an ounce or an ounce and a half for adults, but is liable to cause flatulence and colic. It has been used for children boiled in milk, alone or combined with senna, or it may be eaten as a sort of sugar, a drachm or two at a time. Molasses-candy is also a good laxative and is considerably cheaper.

MANZANITA.

Pharmacology.—The Arctostaphylos glauca (Ericaceæ) is a native of California. Its leaves possess medicinal properties, due to **tannin, arbutin,** and probably, also, **ericolin** and **ursone,** resembling uva ursa in composition and medicinal effects.

Physiological Action.—The drug is astringent, and in small doses tonic and carminative. It is decidedly diuretic.

Therapy.—Manzanita is useful in various affections of the urinary tract, pyelitis, cystitis, stone in the kidneys or bladder; also in strangury, incontinence of urine, irritation of bladder, etc. It is best given in the form of a fluid extract (dilute alcoholic) in doses of f℥ss–ij, four to six times a day.

MARANTA.—Arrowroot-Starch.

Pharmacology and Therapy.—The fecula from the rhizome of the Maranta arundinaceæ (Cannaceæ), of the West Indies and South America, consists wholly of a beautifully-white starch in fine granules. It is used in preparing nourishing articles of food for the sick, with milk, eggs, etc.

MARRUBIUM (U. S. P.).—**Horehound.**

Pharmacology.—The leaves and tops of Marrubium vulgare (Labiatæ), a small herb of Europe and America, contains a bitter principle, **Marrubiin,** with a peculiar **volatile oil,** resin, tannin, etc. It is best given as fluid extract (dose, f℥i–ij).

Therapy.—Horehound is employed as a bitter tonic and stomachic, and as an expectorant, diaphoretic, laxative, and diuretic. It is popular in confectionery as cough-drops, used for sore-throat, cough, and catarrhal conditions of the air-passages. When a diaphoretic effect is desired, the herb may be used in infusion (℥j to Oj), taken hot in recent colds. The cold decoction is serviceable in chronic pulmonary affections.

MASTICHE (U. S. P.).—**Mastic.**

Pharmacology.—A concrete, resinous exudation from Pistachia lentiscus (Terebinthinaceæ), consisting of **Mastichic acid** (90 per cent.), soluble in alcohol, and another resin, **Mastichin,** soluble in ether. It enters into the officinal pills of aloes and mastich, and has no other application at present in medicine, except that it may be used as a temporary filling for decayed teeth, the ethereal solution being used to saturate a small plug of absorbent cotton, which is pressed into the cavity. Mastic is also used in making cements and varnishes.

MATE. See Ilex, page 687.

MATICO (U. S. P.).—**Matico.**

Dose, gr. xxx–℥j.

Preparations.

Extractum Matico Fluidum (U. S. P.).—Fluid Extract of Matico. *Dose,* ♏xx–f℥ij.
Tinctura Matico (U. S. P.).—Tincture of Matico. *Dose,* f℥j–f℥j.
Extractum Matico.—Extract of Matico. *Dose,* gr. ii–xij.

Pharmacology.—The leaves of Artanthe elongata (Piperaceæ), of South America, contain volatile oil ($1\frac{1}{2}$ per cent.), a soft, green, pungent **resin,** a bitter principle termed maticin, **Artanthic acid,** and **tannin.** The odor is aromatic and the taste astringent.

Therapy.—Powdered matico acts as a mechanical hæmostatic, the roughness of the leaves favoring clotting of the blood. Internally the fluid extract is used in inflammations and catarrhal affections of the urinary organs, as chronic cystitis, leucorrhœa, incontinence of urine, and menorrhagia. In hæmorrhages from the stomach, bowels, and kidneys, and even from the lungs, it has also been employed, as well as in diarrhœa and dysentery.

MATRICARIA (U. S. P.).—**German Chamomile.**

Dose, f℥i–iij, in infusion or fluid extract.

Pharmacology.—The flower-heads of Matricaria chamomilla (Compositæ) are officinal under this name. It is a European annual, bearing small, yellow flowers, with white ray-florets; receptacle conical, naked, and hollow. The odor of the plant is due to a blue volatile oil existing in the flower-heads, together with bitter extractive, tannin, etc.

Physiological Action and Therapy.—A decoction, drunk as hot as possible, is a remedy for colds as a diaphoretic; in large doses it acts as an emetic. The cold infusion can be used in smaller quantities as a tonic and stomachic. It is highly prized among the common people in Germany for its wonderful virtues, and in a form of sectarian practice which arose in that country toward the close of the last century "chamomilla" occupied a prominent place, in company with such agents as charcoal, silica, and milk-sugar,—all administered in infinitesimal doses.

MAYS.—**Maize, Indian Corn.**

Pharmacology and Therapy.—The maize, Zea Mays (Graminaceæ), is a cereal of North America, largely cultivated for food. The fruit, or Indian corn, Maidis fructus, contains starch 65 per cent., nitrogenized substances 8 to 10 per cent., with a yellow, fixed oil, sugar, cellulose, and water. Green corn, boiled, is a highly-prized summer vegetable. There are many varieties, but the principal ones are yellow corn and white corn. When ground they afford corn-meal (Maidis farina). Corn-meal is also used for food, as bread, cakes, etc., and, with boiling water, makes a mush, or "hasty pudding." The hot, boiled mush also makes a good poultice, as it retains heat well. Corn-starch (Maidis amylum), made from the ripe corn in the same manner as wheat-starch is prepared, is also an acceptable article of food, used for making puddings, blanc mange, etc. It is in the form of a white, impalpable powder, which can be utilized as a substitute for lycopodium, as a dusting-powder for pills

and troches, and for excoriated surfaces, or as a baby-powder. (For Maidis Stigmata and Maidis Ustilago, see pages 735 and 736.)

MEL (U. S. P.).—**Honey.**

Preparations.

Mel Despumatum (U. S. P.).—Clarified Honey.

Mel Rosæ (U. S. P.).—Honey of Rose (rose 8, clarified honey 92 parts, dilute alcohol q. s.)

Confectio Rosæ (U. S. P.).—Confection of Rose (red rose 8, sugar 64, clarified honey 12, rose-water 16 parts).

Pharmacology.—Honey is a saccharine secretion deposited in the honey-comb by the honey-bee, Apis mellifica (class, Insecta; order, Hymenoptera). Virgin honey is that obtained from recent combs by incision and straining; when heat is used to separate the comb the product is of a darker color, and there is a loss in flavor. What is known as clarified honey is prepared by heating honey on a water-bath, removing the frothy scum which rises, and straining. The flavor of honey is dependent upon the time of the season and the character of the flowers that furnish the saccharine material. It is believed that, at times, poisonous principles have been taken by bees from narcotic plants, and, consequently, the character of the honey has been affected injuriously. The constituents of honey are fruit-sugar, which remains always liquid, and glucose, which tends to crystallize and thicken the honey. Much of the honey used for household purposes has glucose fraudulently added, or it may be entirely an imitation honey.

Physiological Action.—Honey is slightly laxative, and a pleasant, sweet article of food. It is a good excipient for pill-masses.

Therapy.—The old mixture of borax and honey for babies' sore mouth is now rarely used, as the honey favors fermentation, and, besides, adds nothing therapeutically to the mixture, for the borax acts better without it. In glycosuria, the use of honey greatly increases the quantity of sugar voided, and it has been used, therefore, to aid in the diagnosis of diabetes. In sore throat, mel rosæ may be used as an application, in combination with astringents.

MELISSA (U. S. P.).—**Melissa, Balm.**

Pharmacology.—The leaves and tops of Melissa officinalis (Labiatæ), a small herb growing in Europe and in the United States. It contains gum, tannin, bitter extractive, and volatile oil. The odor of the plant is fragrant, and it has an aromatic, slightly bitter taste; the bruised leaves have a lemon-like odor.

Physiological Action and Therapy.—Melissa is carminative, and may be used in infusion, medicated water (distilled), or fluid extract, the dose of the latter being 1 to 2 fluidrachms. The compound spirit of melissa,

or Carmelite spirit, is a cordial containing a number of spices, which make it stomachic and corrective of flatulence.

MENISPERMUM (U. S. P.).—**Menispermum, Canadian Moon-Seed.**
Dose, gr. v–xx, in infusion or fluid extract.

Pharmacology.—The rhizome and rootlets of Menispermum Canadense (Menispermaceæ), a vine or climbing plant of the eastern part of the United States, bearing greenish-yellow flowers in clusters, and kidney-shaped fruit, from which it derives its name. The rhizome may be several feet in length; it contains **Berberine,** also an unnamed white alkaloid, soluble in alcohol and ether, sparingly soluble in water.

Therapy.—Moon-seed, or yellow parilla, is believed to resemble sarsaparilla in possessing diuretic, tonic, and alterative powers, and is also a laxative. In domestic practice it is used to purify the blood in scrofulous affections, etc.

MENTHA.—Mint.

MENTHA PIPERITA (U. S. P.).—**Peppermint.**
The leaves and tops of Mentha piperita (Labiatæ).

Preparations of Peppermint.

Aqua Menthæ Piperitæ (U. S. P.).—Peppermint-Water. *Dose,* f℥j–f℥ij.
Oleum Menthæ Piperitæ (U. S. P.).—Oil of Peppermint. *Dose,* ♏i–v.
Spiritus Menthæ Piperitæ (U. S. P.).—Spirit of Peppermint. *Dose,* ♏x–f℥j.
Trochisci Menthæ Piperitæ (U. S. P.).—Peppermint Lozenges. *Dose,* one or more.
Menthol.—Peppermint-Camphor (a crystalline solid). *Dose,* gr. i–v.
Also entering into compound pills of rhubarb and aromatic wine.

MENTHA VIRIDIS (U. S. P.).—**Spearmint.**
The leaves and tops of Mentha viridis (Labiatæ).

Preparations of Spearmint.

Aqua Menthæ Viridis (U. S. P.).—Spearmint-Water. *Dose,* f℥j–f℥ij.
Oleum Menthæ Viridis (U. S. P.).—Oil of Spearmint. *Dose,* ♏ii–v.
Spiritus Menthæ Viridis (U. S. P.).—Spirit of Spearmint. *Dose,* ♏v–x.

Pharmacology.—The leaves and tops of both the Mentha piperita and the Mentha viridis, of the natural order Labiatæ, are indigenous to Great Britain, but are naturalized in the United States and many other countries. Each variety owes its properties to a volatile oil, from 1 to 1¼ per cent. being present, with some tannin in peppermint. Menthol, which is the stearopten or camphor of peppermint-oil, is deposited, on cooling, from the oil of the fresh herb of Mentha arvensis and Mentha piperita. It smells and tastes like peppermint, is soluble in alcohol, ether, and the fixed and volatile oils, but slightly soluble in water. Menthol occurs in the form of colorless crystals or fused crystalline masses, and resembles Epsom salts in appearance. It is quite volatile and melts at 108° to 110° F.

Physiological Action.—Peppermint, especially the oil, locally has an anodyne, anæsthetic, and antiseptic action. Its taste is rather pleasant and pungent, and it acts as a carminative and stimulant in the stomach, especially in the form of the spirit; the troches are also used for this purpose as well as to disguise a bad breath. Spearmint corresponds, in its effects, with peppermint, but is less powerful and less agreeable.

The taste of menthol is sharp and penetrating. When placed upon the skin it gives rise at first to a burning sensation, which is succeeded by one of coolness, and finally by numbness. It has decided antiseptic power, being comparable in this respect to thymol.

Therapy.—In neuralgia, oil of peppermint may be painted over the painful spot or along the course of the nerve. If the oil is employed, evaporation should be prevented by covering the painted surface with oiled silk. It may also be used for myalgia and many local pains, commonly called rheumatic, and is often of service in chronic gout. In flatulent colic, the spirit of peppermint in hot water is a good household remedy, particularly applicable to children. The oil of peppermint allays nausea, and is serviceable in disguising the taste of unpalatable drugs. Peppermint is a good addition to purgative remedies, as in the compound rhubarb pill, to prevent griping. In pruritus pudendi, peppermint-water is a good application, with a drachm or two of borax to each pint.

Menthol has been employed almost exclusively as a topical remedy, though it has been given internally in the dose of 5 grains for the relief of neuralgia. Its principal usefulness is in the alleviation of itching and pain. It may be applied in the form of a solid pencil or cone, an alcoholic solution, or an ointment. It has also been administered by inhalation in hay fever and diphtheria. In neuralgia (especially when it involves a superficial nerve), in herpes zoster, and dermatalgia, a lotion or ointment containing menthol is capable of affording considerable relief. The pain of a carious tooth may be lessened or removed by placing a menthol solution within the cavity, or menthol dissolved in 15 parts of oil of cloves. The itching of paræsthesia, eczema and urticaria may often be alleviated by the same remedy. Inhalations of menthol have also been successfully resorted to in asthma. It is readily volatilized in a teapot by the addition of hot water. The teapot being closed, the vapor is inhaled as it issues from the spout. Ointments and lotions of menthol may be compounded as follows:—

℞ Acidi carbol.,	ʒss.
Menthol.,	gr. xx.
Ungt. aquæ rosæ,	℥j.—M.

M. Sig.: For paræsthesia, urticaria, and herpes zoster.

℞ Tinct. belladonnæ,
Tinct. aconiti, ... f℈iss.
Menthol., ... ℈ss.
Sp. vini rect., ... f℥ij.
Glycerini,
Aquæ rosæ, ... āā ℥ss.
M. Sig.: Use as a local application in dermatalgia, herpes zoster, and neuralgia.

Dr. Wolf (*Therap. Monatsheft*, September, 1890) recommends menthol rubbed up with sugar (5 to 10 per cent.) applied with a large camel-hair brush, as a local disinfectant in diphtheria, used early in the disease. He advises applications to be made several times in the day, removing as much as possible of the membrane at a time. In laryngeal and tracheal phthisis, and in the laryngeal ulcerations occurring during the course of pulmonary tuberculosis, Rosenberg uses a 20-per-cent. solution of menthol in olive-oil, introduced with a syringe or a spray into the larynx; two or three injections of 15 minims each are made at the affected spot, followed by inhalations of the same from boiling water, or a respirator can be used. The relief from dyspnœa is very great. The secretions grow less, and the ulcers cicatrize and general improvement is noted.

METHYL-VIOLET.—Pyoktanin.

Pharmacology.—Pyoktanin (pus-destroyer) is a descriptive name applied to methyl-violet, an aniline dye which occurs in the form of a paste and in crystals. It was brought forward by Prof. J. Stilling, of Strasburg, who stated his belief that it was able to penetrate tissues and act upon deeply-imbedded pathogenetic micro-organisms. That the dye is absorbed by microphytes is shown by the fact that they are rapidly stained, and absorption is said to produce their death, or, at least, suspension of their energies.

Pyoktanin is devoid of odor, is but slightly irritant, and gives rise to no symptoms of systemic intoxication. It has been employed in the form of powder, pencil, or solution. The paste can be readily molded into pencils. The powder is made by mixing 2 parts of methyl-violet or pyoktanin with 100 parts of talc or other inert material. The solution may be made of any strength from 1 part in 100 to 1 in 2000. It is also used in the form of an ointment containing from 2 to 10 per cent. The same title is given to another variety, yellow aniline, chemically pure and free from arsenic. The blue is the stronger agent.

Physiological Action.—Methyl-violet is an efficient germicide. According to the laboratory experiments of Fessler, the micro-organisms of pus are destroyed in fifteen minutes by exposure to a 1-to-1000 solution of pyoktanin. This conclusion, however, is contradicted by Trojé, who found that, although the development of germs was inhibited by

pyoktanin, yet even after subjection to its action for twelve hours the pus-germs were not certainly destroyed. The latter writer, therefore, asserts that pyoktanin is less powerful than carbolic acid or bichloride of mercury. Pyoktanin does not coagulate albumin. A solution of this substance dropped into the eye is said to cause dilation of the pupil without paralysis of accommodation.

Therapy.—Pyoktanin has been employed almost exclusively as a topical medicament, though Ehrlich and Leppmann state that given hypodermatically it relieves neuralgic and rheumatic pains. The diluted powder, the solution, and the pencil of pyoktanin, from the writer's experience, disinfect suppurating or ulcerated wounds, stimulate reparative action in chronic ulcers, and form excellent applications to chancroids, open buboes, and gummous ulcers, to boils and carbuncles. Good results have been reported in gonorrhœa from the injection of weak solutions. In some cases of chronic cystitis, the injection of a 1-to-1000 or a 1-to-500 solution has been found markedly beneficial. As a dusting-powder, it has been used upon moist eczema. Stilling, in his original paper, laid great stress upon the value of this agent in affections of the eye, especially corneal ulcers, parenchymatous keratitis, and serous iritis. These assertions have not been generally confirmed. In the experience of most ophthalmologists, pyoktanin is by no means superior, if even equal, to corrosive sublimate. It is conceded, however, that pyoktanin acts as a mild, local anæsthetic.

In conjunctivitis, dacryocystitis, etc., pyoktanin is best employed in the form of a solution. In chronic ophthalmia, trachoma and fistulous openings into the lachrymal sac, the pencils of the drug are preferable to use.

Cheatham* reports good results from the use of methyl-violet or pyoktanin in affections of the eye, ear, nose, and throat. Milder conjunctival diseases yielded readily to solutions of pyoktanin, and trachoma was markedly improved by the same remedy. Gould† states that the effects of pyoktanin in dacryocystitis and lachrymal conjunctivitis have been in his experience extraordinarily good. The same observer writes that excellent results follow the application of pyoktanin in unhealthy orbital cavities after enucleation. It likewise acts well in a certain class of corneal opacities, serving to clarify the tissues and increase visual acuity. Tiffany (*Medical Age*) likewise reports good results from methyl violet in eye diseases; particularly in marginal blepharitis, or tinea tarsi, ½-per-cent. pomade made with this drug and carefully worked into the roots of the lashes brings about a speedy cure.

* "Pyoktanin in Diseases of the Eye, Ear, and Throat," by W. Cheatham, M.D. The Cincinnati Lancet and Clinic, November 15, 1890.

† "Pyoktanin in Diseases of the Eye," by George M. Gould, M.D. University Medical Magazine, December, 1890.

Some observers, on the other hand, report in eye diseases bad or negative results from the employment of methyl-violet. Bayer,* for instance, states that after its use in 46 cases of scrofulous pannus, various types of corneal ulcer, dacryocystitis, parenchymatous keratitis, iritis, and sympathetic iridocyclitis, he came to the conclusion that the excellent qualities attributed by Stilling to this aniline dye did not exist in fact; and, moreover, in addition to disagreeable discolorations, may occasion harmful results from their application.

In eye diseases Braunschweig also found pyoktanin to cause great damage; Kölliker observed no benefit from it, and Mauthner considers pyoktanin useless.

The great difference in the results thus reported from the use of pyoktanin is explained by the observation made by Liebreich (*Therap. Monatshefte*, July, 1890), namely, that pyoktanin, or methyl-violet, is a mixture of aniline products of uncertain composition.

In otology,† likewise, testimony as to its value is conflicting. While in some cases its use was attended with excellent results in purulent inflammation of the middle ear, furuncle of the external meatus, or after removal of a polypus from the meatus, in other cases of otitis pyoktanin proved a failure. Mosetig reports‡ good results of methyl-violet in the treatment of malignant growths.

The absence of odor is one feature which makes this substance preferable to iodoform. On the other hand, methyl-violet communicates a deep-purple color to the skin or linen with which it comes in contact. This stain may be removed, however, by dilute hydrochloric or nitric acid, alcohol, or cologne-water.

METHYSTICUM. See Kava-Kava, page 716.

MEZEREUM (U. S. P.).—**Mezereon.**

Dose, gr. x.

Preparations.

Extractum Mezerei (U. S. P.).—Extract of Mezereon. Used only as an irritant.

Extractum Mezerei Fluidum (U. S. P.).—Fluid Extract of Mezereon. Used only as an irritant.

Unguentum Mezerei (U. S. P.).—Ointment of Mezereon (contains fluid extract of mezereon 25, lard 80, yellow wax 12 parts; the alcohol of the extract being entirely evaporated by heat).

Pharmacology.—Mezereon is the bark of Daphne mezereum (Thymelaceæ) and of other species of Daphne, growing in Europe and Asia in mountainous regions. It contains **Daphnin,** a bitter glucoside in colorless

* "Pyoktanin in Diseases of the Eye," Medical News, December 6, 1890.

† See paper on "Experiences with Pyoktanin in Ophthalmological and Otological Practice," by Adolf Alt, M.D., St. Louis Courier of Medicine, January, 1891.

‡ The British Medical Journal, February 7, 1891.

crystals, sparingly soluble in cold solvents; an acrid, rubefacient, **volatile oil**, and a soft, brown, acrid **resin**, which is the anhydride of **Mezereinic acid.** Mezereon is an ingredient in the compound decoction and compound syrup of sarsaparilla, and the extract enters into the compound mustard liniment. (See Sinapis.)

Physiological Action.—The powdered bark is irritating to the skin and, when fresh, causes vesication; it excites violent sneezing when inhaled into the nostrils. In small doses internally it is sialagogue, laxative, and diuretic, and is considered tonic and alterative. In large doses, it is a violent, irritant poison, causing vomiting, purging, and inflammation of the stomach and intestines. Nephritis is said to follow its tonic administration. The treatment would be eliminative and symptomatic. Demulcent drinks, starch-water, etc., may be freely swallowed, and hypodermatic injections of morphine given. The ointment is used as an irritant to keep up discharges from ulcers and blistered surfaces.

Therapy.—The use of mezereon in medicine is restricted to its external application in the form of an irritant ointment, as first mentioned, and its combination with sarsaparilla and other remedies in the forms above referred to, as an alterative in syphilis and chronic rheumatism, associated with iodide of potassium.

℞ Potassii iodidi, ... ʒij.
Syr. sarsaparillæ co.,
Aquæ, ... āā f℥iij.

M. Sig.: A tablespoonful two hours after meals, for syphilis, rheumatism, and skin diseases.

Mezereon-bark has been successfully used to relieve toothache, and as a masticatory in paralysis of the tongue.

MITCHELLA.—Squaw-Vine, Checker-Berry, Winter-Clover, Partridge-Berry.

Dose, f℥ss–j, in infusion or fluid extract.

Pharmacology.—The whole plant of Mitchella repens (Rubiaceæ) is used in making the infusion and fluid extract. It is a small, creeping, evergreen herb, with red berries appearing in the autumn, which may remain until spring. The leaves and berries have a flavor like that of gaultheria; the composition is unknown.

Physiological Action.—The preparations of Mitchella are said to be astringent, diuretic, and parturifacient; they are also supposed to favor the occurrence of menstruation.

Therapy.—In dropsy and suspension of urine the infusion is given, and also in dysmenorrhœa, menorrhagia, etc. Its name of "squaw-vine" was gained from its use by the Indians, who administered the infusion to women for several weeks before the expected occurrence of parturition in order to facilitate delivery.

MORPHINA (U. S. P.).—**Morphine, Morphium.** (See Opium.)

MORRHUÆ OLEUM (U. S. P.).—**Codliver-Oil.**

Dose, f℥j–℥ss.

Pharmacology.—A fixed oil, obtained from the fresh liver of Gadus morrhua, or of other species of Gadus (class, Pisces; order, Teleostia; family, Gadida). It is a nearly colorless or straw-colored, thin, oily liquid, consisting chiefly of **Olein** and other fatty principles. The best oil is that containing the largest proportion of olein, which congeals at a lower temperature than the oils of inferior quality. It also contains a peculiar principle named **Gaduin,** with **Trimethylamine,** and traces of iodine, bromine, phosphoric and sulphuric acids, and biliary salts. Good oil should be pale in color; should not have a strong, fishy smell or taste; should not deposit much granular fat at 32° F., and should, when treated with sulphuric acid, give a violet color-reaction, changing to brownish red. "If 1 drop of the oil be dissolved in 20 drops of disulphide of carbon, and the solution shaken with 1 drop of sulphuric acid, it will acquire a violet-blue tint, rapidly changing to rose-red and brownish yellow. With nitric acid the oil yields a purple color, changing to brown" (U. S. P.). The investigations of Gautier and Mourgues in 1888, into the composition of codliver-oil, showed its complex character; they claimed to have found several new alkaloids, the principal ones being hydrolutidine, aselline, and morrhuine, besides an unstable, fatty substance, morrhuic acid, containing phosphorus and resembling lecithine of nerve-tissue. Under the name of **Morrhuol,** M. Chapoteaut has isolated these principles from codliver-oil, in the form of an amber-brown, bitter, aromatic liquid, partially crystallizing at a low temperature, and consisting of the free oleic acid of the oil, alkaloids, and the fatty combinations with sulphur, iodine, bromine, and phosphorus. Thus, morrhuol represents the medicinal value of codliver-oil in very much reduced bulk. The usual dose of morrhuol is 1 or 2 capsules, each containing 20 centigrammes (about 3 grains), taken with or immediately after meals. Children take 2 to 4 daily and adults 6 to 8 daily. Capsules of morrhuol creasote may also be obtained (each containing 3 grains of morrhuol and 1 minim of pure beech-wood creasote).

Physiological Action.—Externally, codliver-oil acts as a bland oil without causing irritation, and is even instilled into the eye by oculists. Its fishy smell is an objection to its use by inunction, and yet in infants this is such a valuable method of introducing it into the blood that the objection is overlooked. Applied to the surface in fevers, it reduces bodily temperature. Internally, in doses suited to the powers of assimilation, it increases the appetite and improves nutrition, enhances the number of red blood-corpuscles, stimulates healthy cell formation, and

exerts an alterative effect. Morrhuol, not being fatty (to the same extent, at least), does not directly increase the bodily weight, but otherwise acts physiologically in the same manner as the oil. According to Gautier and Mourgues, many of the alkaloids of codliver-oil, as butylamine, amylamine, and especially morrhuine, together with morrhuic acid, stimulate the nervous system, promote tissue change, cause a rapid increase of the urine and perspiration, and, proportionately, sharpen the appetite. In addition, the phosphorus exists in organic combination capable of being readily appropriated by young cells. The association of fatty bodies with biliary matter promotes absorption and assimilation. The properties of the iodine and bromine are also enhanced by the state of organic combination in which they exist.*

Therapy.—In children suffering with marasmus, scrofula, chronic skin affections, tuberculosis, and wasting diseases generally, the use of codliver-oil by inunction daily, or several times a week, produces rapid improvement. The patient is stripped and the oil applied over the surface of the body, with the manipulations of massage, before a warm fire; a blanket is wrapped around him, which is to be kept on for an hour or two; the excess of oil is then removed by a warm bath containing a little whisky or bay rum. In this way the child does not have such a disagreeable odor as when the oil is simply applied under its binder. In the cœliac affection of children, characterized by suspension of function of the pancreas, this method is particularly applicable, and is absolutely necessary in order to keep up nutrition. In cases of whooping-cough similar inunctions to the chest are very serviceable. These inunctions are likewise valuable in the case of children exhausted by chronic diarrhœa, and of adults who suffer with chronic dysentery and scaly skin diseases. The daily inunction of codliver-oil is of some service in reducing the susceptibility to taking cold. The local application of this agent is useful in chronic rheumatism and rheumatoid arthritis. The internal administration or external use of codliver-oil is advisable in rachitis and laryngismus stridulus. As an internal remedy it is sometimes effective in habitual constipation in children. This oil has been used with advantage in diabetes mellitus characterized by great debility, and is especially indicated if it is associated with pulmonary phthisis.

Codliver-oil is used internally as a nutrient as well as a medicine. Its value is most marked in chronic disorders attended by malnutrition, in phthisis, chronic pulmonary processes, rheumatic affections, rheumatoid arthritis, and atheroma. It is also very useful in nervous affections, chorea, neuralgia and epilepsy, in syphilitic and strumous cachexia, and various eruptions upon the skin due to them. In convalescence from

* Annales de Thérapeutique Médico-Chirurgicales, March, 1890.

many diseases, codliver-oil is an easily-assimilated form of nourishment. Chronic gout is ameliorated by the administration of codliver-oil. In chronic bronchitis it is of service, facilitating expectoration and promoting the nutrition of the diseased membrane. It is also a valuable remedy in emphysema. Codliver-oil is indicated in caries or necrosis of bone due to tuberculosis. In neurasthenia it may be given with advantage. The exhibition of this remedy is of especial utility in many cases of convalescence from measles or scarlatina. In pannus and chronic conjunctival affections, codliver-oil has been instilled into the eye with good results.

Special Forms.—There can be no question that the digestibility of the oil is increased by mechanical and chemical conditions, as when given in the form of a good emulsion (not a soap, but a minute subdivision of fat-globules in a mucilaginous medium, resembling milk), and by the addition of pancreatin, and also by association with certain restorative agents, like the hypophosphites, or the lacto-phosphate of calcium. The immense demand for these emulsions, stimulated by judicious advertising, has led to a very large production and much competition among manufacturing pharmacists to supply the requirements of the physician and patient. In manufacturing on a large scale, cost is carefully estimated, and the result in many cases is that an inferior grade of oil is used. It would be better for physicians to order an extemporaneous emulsion made with the best oil by responsible pharmacists, or instruct patients how to make it (white of egg, pancreatin, oil, and, if desired, a little whisky or Jamaica rum, stirred with an egg-beater or simply shaken together in a bottle, make a very acceptable preparation). A serviceable emulsion for children is made by rubbing together codliver-oil and extract of malt (or maltine), equal parts. Gubb maintains that codliver-oil forms a solution with aqueous extract of malt, and that this combination is the most efficient means of disguising the taste of the oil. If there are fishy eructations, liquid pancrobilin may be given with the oil, or liquor pancreaticus, which will emulsify the oil and favor its absorption.

The following emulsions, containing codliver-oil, will be found to be serviceable:—

℞ Olei morrhuæ,
Glycerini,
Syrup. hypophosphitum, ... āā f℥iv.
Olei cinnamomi, ... ♏x.

M. et ft. emul. mist.

Sig.: A tablespoonful three times a day. Valuable for tuberculosis, debility, and chronic skin diseases, such as eczema, psoriasis, acne, and seborrhœa.

℞ Olei morrhuæ, ... f℥viij.
Liquor. pancreatini, ... f℥ij.
Pulveris myristicæ, ... ʒiij.

M. et ft. emul. mist.

Sig.: A tablespoonful just before meals. Use in debility and weak digestion.

℞ Olei morrhuæ,
Liquor. calcis, ... āā f℥v.
Olei gaultheriæ, ... ♏x.

M. et ft. emul. mist.

Sig.: A dessertspoonful three times a day. Serviceable in scrofula, tuberculosis, and in chronic skin diseases.

℞ Olei morrhuæ,
Syrup. pruni Virg.,
Ext. malti, ... āā f℥iv.

M. et ft. emul. mist.

Sig.: A tablespoonful three times a day. Employ in debility, in diseases of the throat, and in chronic bronchitis and tuberculosis.

℞ Olei morrhuæ,
Spiritus vini gallici,
Syrup. hypophosphitum cum ferro, ... āā f℥iv.
Ol. menth. pip., ... ♏x.

M. et ft. emul. mist.

Sig.: A tablespoonful three times a day. For syphilis, scrofula, and chronic diseases.

℞ Olei morrhuæ, ... f℥iv.
Olei eucalypti,
Creasoti, ... āā ♏x.
Spiritus ætheris comp., ... f℥j.

M. et ft. emul. mist.

Sig.: Two teaspoonfuls three times a day. Beneficial in tuberculosis and chronic tuberculosis.

The preliminary administration of an ethereal preparation, like Hoffman's anodyne or pure ether, in cold water will favor the digestion of the oil by stimulating the flow of the pancreatic fluid. An addition of 1 per cent. oil of eucalyptus is said to make it more acceptable to the palate. It is a good plan to eat a slice of lemon after taking the plain oil, in order to remove the oily taste from the mouth. Numerous other methods have been suggested in order to conceal the taste of codliver-oil and aid its assimilation. Alcohol in some form is frequently used for this purpose. Washing the mouth out with brandy or whisky will partially obtund the sense of taste, so that a dose of oil may be quickly swallowed without exciting much sensation. The oil may be poured into the froth of beer in such a manner as not to touch the edge of the glass, or it may be taken in a hot punch. A few drops of chloroform will, it is said, disguise the taste. A little salt, taken just before and after the oil, has been recommended. Some prefer to take it in black coffee. It is stated that tomato catsup covers the taste of codliver-oil, and that

chewing smoked herring, or a sardine, accomplishes the same purpose. Others administer it in milk or in lime-water, to which a drop or two of some essential oil has been added. A formula given by Seig may effectually disguise the taste, while the odor of the mixture resembles that of roasted meat:—

℞ Olei morrhuæ,	f℥lxx.
Creasoti,	♏xl.
Saccharin.,	gr. iss.—M.

Some patients prefer to take the oil before meals, and find the eructations do not occur, as when taken after eating. The mistake is generally made of giving it in doses larger than can be digested, with the result of disordering the stomach and even exciting diarrhœa. A ferrated codliver-oil is made by dissolving 10 parts of benzoate of iron in 1000 parts of the oil, with the aid of gentle heat and frequent agitation. It is a clear, reddish-brown liquid. The oleate of quinine may be combined with it in any desired quantity.

Lipanin is an artificial mixture, intended as a substitute for codliver-oil. It was devised by von Mering, and consists of 6 parts of oleic acid to each 100 of olive-oil. It is free from disagreeable odor and taste, and is readily emulsified and easily digested; it may be given with the hypophosphites of calcium and sodium (gr. x of each) several times a day. Galatti* finds lipanin palatable and well borne by children; under its use they increase in weight and appetite, but the tuberculous process does not seem to be influenced by it. It costs more than codliver-oil.

MOSCHUS (U. S. P.).—**Musk.**
Dose, gr. v–viij.

Preparation.

Tinctura Moschi (U. S. P.).—Tincture of Musk (10 per cent.). *Dose,* fʒss–j.

Pharmacology.—Musk is the dried secretion from the preputial follicles of Moschus moschifera (class, Mammalia; order, Ruminantia) or musk-deer. The musk-sac is, in the living male animal, situated between the navel and the genitals, but nearer the latter, between the skin and the muscles of the abdomen. Musk in pods, or musk in the unopened sacs, is the only kind to be used in medicine, each sac containing from 60 to 130 grains of actual musk. It is imported from China. Genuine Tonquin musk is composed of roundish grains of irregular size, dark reddish-brown, of a peculiar, penetrating, persistent odor and a bitter taste. It is partly soluble in water, and less so in strong alcohol; dilute alcohol dissolves about one-half. The odorous principle is probably a

* Annual of the Universal Medical Sciences, 1890, vol. v, p. A-88.

product of decomposition, constantly being formed; complete drying destroys it, but it returns again after moisture has been added. It is also destroyed by hydrocyanic acid and by camphor. Musk contains ammonia, fat, cholesterin, resinous matter, fatty acids, etc. It is largely used in perfumery, being very lasting and holding more evanescent perfumes with it. Musk in grains is much adulterated, or spurious. An artificial musk* has been produced, but quinine sulphate has the property of destroying its odor, while genuine musk is in no way affected by it.

Physiological Action.—Musk is a diffusible stimulant and antispasmodic. It creates a sensation of heat in the stomach, and in some persons excites nausea and vomiting. Headache and giddiness are also produced, with stimulation of the sexual appetite. A primary excitement of the central nervous system is succeeded by a more or less marked soporific effect. According to Brunton, musk appears to stimulate the respiratory centre. Artificial musk is reported to have little or no physiological or therapeutical effect, even when used subcutaneously.

Therapy.—Musk has been used in collapse of typhoid and other low fevers; also in hiccough, delirium tremens, and in convulsions of children. In many of the manifestations of hysteria—emotional crises, palpitation of the heart, vomiting, or spasm—this remedy is of value. The same may be said regarding other spasmodic affections, as chorea, whooping-cough, and laryngismus stridulus. It has been considered beneficial in melancholia and irregular gout. Its high price and the difficulty of obtaining an unadulterated article take it out of the ordinary range of remedies.

MUCUNA.—Mucuna, Cowhage.

Pharmacology and Therapy.—The hairs scraped from the pods of Mucuna pruriens (Leguminosæ), of the East and West Indies, were formerly used as a vermifuge, a drachm or two being mixed with molasses and administered to children suffering with round worms. It causes irritation, simulating an erythematous or urticarial eruption when brought in contact with the skin. It is said that dishonest horse-dealers use cowhage to make horses appear more spirited, by applying it to anus, or genitals, just before exhibiting the animal for sale.

MUSCARINA.—Muscarine. See Agaricus Muscarius, page 411.

MYRCIÆ OLEUM (U. S. P.).—**Oil of Myrcia, Oil of Bay.**

Preparation.

Spiritus Myrciæ (U. S. P.).—Spirit of Myrcia (bay-rum). External use.

* "Artificial Musk," Pacific Record, December 15, 1890.

Pharmacology and Therapy.—The oil of myrcia is distilled from the leaves of Myrcia acris (Myrtaceæ), or bay-tree, of the West India Islands. It contains **Eugenic acid** and a hydrocarbon. It is used only as a perfume. The spirit, or bay-rum, is an agreeable cooling application in fevers, headache, etc.

MYRICA.—Myrica, Bayberry-Bark.

Dose, gr. xx–xxx.

Pharmacology.—The Myrica cerifera (Myricaceæ), a native of North America, contains in its bark a volatile oil and acrid resin.

Physiological Action.—**Myrica** is stimulant and astringent.

Therapy.—Externally, the infusion or diluted fluid extract of Myrica may be used as a gargle or injection in various affections of the mucous membranes. It has also been employed in dysentery and diarrhœa.

MYRISTICA (U. S. P.).—**Nutmeg.**

Dose, gr. v–xx.

Preparations.

Oleum Myristicæ (U. S. P.).—Volatile Oil of Nutmeg. *Dose,* ♏i–v.

Spiritus Myristicæ (U. S. P.).—Spirit of Nutmeg. *Dose,* f℥i–ij.

Pulvis Aromaticus (U. S. P.).—Aromatic Powder (cinnamon 35, ginger 35, cardamom and nutmeg each 15 parts). *Dose,* gr. v–ʒj.

Pharmacology.—The nutmeg is the kernel of the seed of Myristica fragrans (Myristicaceæ) deprived of its testa. The outer covering or arillus of the fruit is officinal under the name of **Macis,** or mace. The tree is a native of the East Indies, but grows also in the West Indies and in South America. The kernels of the seeds are round or elliptical in shape, about an inch in greater diameter and ¾ inch in smaller diameter. They are rather dense and heavy, and contain 2 to 8 per cent. of a volatile oil (which is officinal), and from 25 to 30 per cent. of fixed oil, usually known as oil of mace, with some resin. Nutmeg is fragrant, spicy, and somewhat bitter. It is useful in flavoring, and enters into a number of pharmaceutical preparations: aromatic spirit of ammonia, aromatic tincture of rhubarb, aromatic powder, compound tincture of lavender, troches of chalk, of magnesia, and of bicarbonate of sodium, and also is a constituent in vinegar of opium.

Physiological Action.—With aromatic and carminative qualities, nutmeg unites considerable narcotic power, and in overdoses produces stupor and delirium. Dr. John Gillespie has reported a case* where five powdered nutmegs, taken to procure an abortion, had produced frontal headache, vertigo, free perspiration and urination, narcosis, and collapse. The treatment was an emetic of sulphate of zinc (gr. xxx), followed by

* Philadelphia Medical Times, vol. xvii, page 726.

small, repeated doses of aromatic spirit of ammonia. A similar case has been reported by Waugh.

Therapy.—The volatile oil of nutmeg is rubefacient, and may be used in rheumatism, neuralgia, and paralysis. Internally, the powdered or grated nutmeg is employed as a carminative, anodyne and astringent, to relieve sick stomach and for diarrhœa; it also allays colalgia and intestinal spasm. Garretson employs nutmeg for diarrhœa combined as follows:—

℞ Pulveris myristicæ,		
Bismuth. subnit.,	āā	℥ss.
Cretæ præparatæ,		gr. lxxx.
Syrup. zingiberis,		f℥iij.

M. Sig.: From a teaspoonful to a dessertspoonful every two hours.

Small doses favor digestion by stimulating the secretion of gastric juice. Nutmeg may be used to disguise the taste of unpalatable mixtures and to prevent the griping of a cathartic medicine. Mace acts similarly, but is used as a spice or condiment more than as a medicine. The expressed oil of nutmeg may be combined with wax and olive-oil, with heat, as ordered in the German Pharmacopœia, to form the myristicæ ceratum used as a warming application to the abdomen of babies suffering with colic or indigestion.

MYRRHA (U. S. P.).—**Myrrh.**

Dose, gr. ii–xxx.

Preparations.

Tinctura Myrrhæ (U. S. P.).—Tincture of Myrrh (20 per cent.). *Dose,* f℈ss–ij.

Tinctura Aloës et Myrrhæ (U. S. P.).—Tincture of Aloes and Myrrh (of each 10 per cent.). *Dose,* f℈i–iv.

Pilulæ Aloës et Myrrhæ (U. S. P.).—Pills of Aloes and Myrrh (purified aloes, gr. ij; myrrh, gr. j; aromatic powder, gr. ss, in each pill). *Dose,* one to three.

Tinctura Myrrhæ et Capsici.—Tincture of Myrrh and of Capsicum, "Hot Drops" or "No. 6" (myrrh 6, capsicum 3, alcohol 100 parts). *Dose,* f℈ss–j.

Pharmacology.—Myrrh is a gum-resin obtained from Balsamodendron myrrha (Burseraceæ). It contains 60 per cent. of gum, 35 per cent. of **Myrrhin,** a resin, and about 2 per cent. of myrrhol, an ethereal oil; also some bitter principle. It forms an emulsion when rubbed up with water, which dissolves about 60 per cent. With alcohol it is partly soluble, forming a brownish-yellow tincture. Myrrh enters into several officinal preparations besides those mentioned above, as the compound iron mixture, compound iron pills, compound galbanum pills, and compound rhubarb pills.

Physiological Action.—Myrrh is slightly astringent and stimulant locally, and internally is carminative in small doses, but large ones

cause vomiting and purging. It has some expectorant qualities, and is a stimulant to the ovarian and uterine functions.

Therapy.—Diffused in water, with the addition of a little carbolic acid or thymol, tincture of myrrh is a good mouth-wash for spongy gums, sore throat, or wounds after operations upon the mouth, or ptyalism occurring after the use of mercury. It may be applied in the full strength to ulcerated gums, aphthous patches, relaxed uvula, and freckles. It is also used in dentifrices and to correct bad breath. A lotion or ointment containing myrrh is a stimulant and antiseptic dressing to indolent or unhealthy ulcers. Favorable reports have been made of its action in atonic dyspepsia and gastralgia, though it has usually been prescribed in combination with other remedies. In amenorrhœa, it is often given in conjunction with iron. Internally, myrrh is considered valuable in checking excessive discharges, bronchorrhœa, leucorrhœa, cystitis, etc.

MYRTOL.

Dose, gr. iv.

Pharmacology.—The Myrtus communis (Myrtaceæ) is a beautiful evergreen shrub or small tree; a native of the countries surrounding the Mediterranean. Its leaves and berries contain a volatile oil. According to E. Jahns, the myrtle-oil of Spanish origin contains various terpenes, cineol, and a camphor-like body, and the myrtol of commerce should more appropriately be termed rectified myrtle-oil.

Physiological Action.—Myrtol is disinfectant and antiseptic. It causes no irritation when applied to the sound skin. Upon an abraded surface it gives rise to a slight burning sensation, which, however, soon disappears, and a 9-per-cent. emulsion of myrtol completely arrests the growth of the micro-organisms of pus. The decomposition of organic material is prevented by myrtol. Taken internally it promotes digestion. Large doses occasion nausea and headache. It is removed from the system by the lungs and kidneys, and communicates a violet-like odor to the breath and urine.

Therapy.—Externally, myrtol has been used with success as a disinfectant to surfaces covered with unhealthy, or decomposing, pus. It has proved efficacious in cutaneous diseases of vegetable parasitic origin, and has been recommended as a local remedy in psoriasis. Given internally, it has been found destructive to lumbricoid and thread worms. Eichhorst advises its use in chronic bronchitis attended with profuse and fetid muco-purulent expectoration. The sputum becomes less abundant, less purulent, and less offensive. It diminishes fœtor in gangrene of the lung. In pulmonary tuberculosis it is said to decrease the number of bacilli. This remedy has also given relief in chronic pyelitis and

cystitis, and has proved useful in passive hæmorrhage. Myrtol was introduced to the notice of the profession in 1878 by Dr. Linarix.*

NAPHTHALINUM.—Naphthaline, Coal-Tar Camphor.

Dose, gr. i–x.

Pharmacology.—Naphthaline is a benzine derivative, separated from coal-tar by distillation, occurring in the form of white crystals, which may be compressed into cakes like camphor, and having a peculiar odor. It was discovered by Garden in 1820. Naphthaline is insoluble in water, but soluble in alcohol, ether, and chloroform. Being destructive to insect life, it is employed as a substitute for camphor in preventing the invasion of moths.

Physiological Action.—Naphthaline may be prescribed internally as an intestinal antiseptic in doses of gr. ii–x (or to children, gr. i–iij) every three or four hours. It may be given with white sugar in capsules or wafers. It has also decided expectorant powers, although its insolubility only permits a small quantity to be absorbed, which is discharged as naphthol or phenol by the bronchial mucous membrane or the urinary passages, thus acting as a local disinfectant at the point of excretion. It is devoid of local irritant properties.

Therapy.—Naphthaline is a useful antiseptic in treating ulcers, cancers, and pus-cavities; it can be used in watery emulsion, in alcoholic solution, or in a dry form. In addition to the affections named, a naphthaline ointment is advantageously applied to chancres, chancroids, syphilitic ulcers, sloughing wounds, chronic eczema, and psoriasis. This ointment may contain 30 grains or more to the ounce of basis:—

℞ Hydrarg. chloridi mitis,	gr. x.
Naphthalini,	ʒj.
Ungt. camphoræ,	ʒvij.

M. For chancroids, ulcers, and chronic eczema.

In intestinal disorders due to infection, *e. g.*, typhoid fever, diarrhœa, and possibly in cholera, naphthaline is of eminent usefulness in diminishing the activity of the bacteria of the intestinal canal, as shown by C. Sehrwald, who also advises the use of calomel in conjunction with naphthaline in order to increase the bactericidal effect.

NAPHTHOL, ALPHA and BETA.

Dose, gr. ss–v.

Pharmacology.—Alpha- and beta- naphthols are obtained by heating together for several hours naphthaline and sulphuric acid. A large quantity of hot water being then added to the mixture, the excess of naphthaline is filtered off and the solution saturated with lead carbonate.

*De l'Emploi du Myrtol ou l'Essence de Myrte principalement dans les Maladies des Voies Respiratoires et Genito-Urinaires.

From these lead-naphthaline sulphonates the respective acids are prepared, and from the acids fused with an alkali two naphthols are made,—the alpha and beta. Beta-naphthol is the first to crystallize, and is readily separated from the alpha variety by boiling alcohol, in which the latter is insoluble. Pure alpha-naphthol is perfectly white, melts at 122° C. (241.6° F.), and boils at 286° C. (546.8° F.). Genois shows that when alpha-naphthol is treated with chloride of iron the solution turns green, and white di-naphthol is precipitated. Alpha-naphthol is insoluble in cold and slightly soluble in hot water. It is very soluble in ether and alcohol, from either of which it crystallizes in white, shining needles. Alpha-naphthol has an aromatic odor and somewhat pungent taste, and is converted, with heat and dilute hydrochloric acid, into naphthaline and sulphuric acid. Genois states that impure alpha-naphthol is dangerous and quite unfit for medicinal use.

Physiological Action.—Alpha-naphthol, used internally, produces warmth in the stomach, stimulates the glands of the entire gastro-intestinal tract, and tends to make the fæcal discharges of rather a soft consistency. Large doses have caused increase in the arterial tension and symptoms of cerebral hyperæmia. The systemic action of alpha-naphthol differs but little from that observed from the administration of beta-naphthol. Alpha-naphthol has marked antiseptic properties. Maximovitsch reports (*Merck's Bulletin*) that alpha-naphthol, in the proportion of 1 to 10,000 of culture-gelatin, prevents the growth of the most various pathogenic microbes; even in the proportion of 0.6 or 0.8 to 10,000 it retards the development of microbes by three to eight days. This experimenter, further, adds that similar antiseptic effects were produced by beta-naphthol, but twice as much, he reports, had to be used to produce the same results. Alpha-naphthol has a stimulating and astringent action upon the skin.

Therapy.—Alpha-naphthol, from the writer's experience, is certainly a good antiseptic. It is also a useful disinfectant. Alpha-naphthol solution, from 1 to 30 grains to the ounce of distilled or boiled water, is serviceable in treating wounds or ulcers, and for all surgical procedures requiring an antiseptic agent. Alpha-naphthol solutions are beneficial in seborrhœa, acne, rosacea, chronic eczema, and alopecia. Nasal catarrh, buccal inflammations, pharyngitis, and laryngitis, are often relieved or removed by the application of alpha-naphthol solutions. The solution can, in the diseases just named, be used with advantage in the form of a spray. Solutions of alpha-naphthol can be employed with advantage in injections for gonorrhœa in both sexes, in gleet, in leucorrhœa, and in irritation and inflammation of the lower portion of the rectum. Alpha-naphthol incorporated in some fatty substance (gr. v to lx to the ounce),

as lard, suet, butter, lanolin, zinc or lead ointment, can be used for very many diseases of the skin, such as chronic acne, rosacea, psoriasis. chronic eczema, alopecia circumscripta, and for chronic ulcers. According to the author's experience, alpha-naphthol, while a good stimulating and astringent substance, having also antiseptic properties, lacks, to a great extent, the anæsthetic or sedative effects upon the integument which belong to beta-naphthol. Further, the internal use of alpha-naphthol has not been followed, in the writer's experience, with that decided action observed from beta-naphthol. Alpha-naphthol can, however, be employed internally in from ½ to 5 grains, three or four times a day, for chronic catarrh of the stomach or bowels, and in constipation. It can also be used as an antiseptic in smaller doses (¼ to 10 grains three or four times a day) in typhoid and other fevers.

NAPHTHOL, BETA.

Dose, gr. ss–v.

Pharmacology.—Beta-naphthol occurs as colorless scales, or as a white, crystalline powder, melts at 253.4° F., is soluble in 75 parts of boiling water, and is freely soluble in alcohol, ether, chloroform and fixed oils. M. Charrin (*Le Bulletin Médical*) states that a saturated solution of boric acid in water increases the solubility of beta-naphthol. Beta-naphthol has a pungent taste, but is free from odor. Naphthol and salicylic acid have been combined and used under the name of sali-naphthol.* (See under Salicin.) It is odorless, tasteless, and insoluble in water.

Physiological Action.—When taken internally naphthol gives rise to a sensation of warmth in the stomach. The fæces are softened and clay-colored. Diarrhœa is occasionally produced. Large doses sometimes cause vertigo, buzzing in the ears, and symptoms of cerebral hyperæmia. Beta-naphthol is slightly stimulant to the skin and mucous membranes, allays pain and pruritus. It is one of the most powerful antiseptic agents, possessing three times the strength of carbolic acid or iodoform and four times that of creasote or naphthaline. It may be regarded as absolutely safe, since, according to Professor Bouchard's investigations, nearly half a pound would be required to cause death in a healthy person weighing 150 pounds. Kobert believes that by the action of the pancreatic juice and the intestinal ferments, naphthol with salicylic acid, or sali-naphthol, is split up into salicylic acid in the urine. Lepine,† on the contrary, stated that the intestinal juice is incapable of producing this decomposition, but added that it may be brought about by the pancreatic secretion. The decomposition of sali-naphthol he reports may be due simply to an alkaline reaction.

* Therapeutic Gazette, January 15, 1891.
† Journal de Médecine de Paris, November 16, 1890.

Therapy.—Beta-naphthol is a valuable local remedy in parasitic diseases of the skin. An ointment containing ½ drachm to the ounce is destructive to pediculi and their ova. The same preparation is equally fatal to the itch-mite, and at the same time relieves the inflammation occasioned by the parasite. It soothes the irritation produced by the bites of fleas, bed-bugs, and mosquitoes. The various forms of tinea trichophytina yield to the influence of naphthol ointment. The itching of paræsthesia, urticaria, pemphigus, and prurigo is very successfully treated in the same manner. Beta-naphthol is especially valuable when the skin is rough and infiltrated. In chronic eczema and psoriasis it is a reliable medicament. The secretions of the skin are favorably influenced, and it very often proves useful in the treatment of hyperidrosis and bromidrosis. Benefit also results from the employment of this substance in acne, seborrhœa, sycosis, alopecia circumscripta, lupus erythematosus and vulgaris, chronic ulcers, chancres, and chancroids. The remedy may be used in the form of a powder, lotion, or ointment. It is often well combined with bismuth or other mild powder, as—

℞ Naphthol. beta, ... gr. xv.
Bismuthi subnitratis, ... ℥j.
M. For use as a dusting powder.

The odor of cancer and ozæna is overcome by naphthol. It is an excellent antiseptic dressing to wounds, and may often be advantageously employed, according to the method of Professor Reverdin, by impregnating previously sterilized gauze bandages with an ethereal solution. An aqueous solution may be used with good result in mercurial salivation and chronic pharyngitis. Vaginitis, vulvitis, gonorrhœa, and gleet are notably improved by the use of naphthol. For gonorrhœa and gleet an injection may be composed as follows:—

℞ Naphthol. beta, ... gr. v.
Glycerini, ... f℥j.
Aquæ, ... f℥iij.—M.

A solution of beta-naphthol in glycerin and water is useful in chronic otorrhœa. An aqueous solution of the strength of 1 to 2500 has yielded good results in purulent ophthalmia. In simple or granular conjunctivitis and trachoma, likewise, this agent has proved a valuable remedy. This substance is very advantageously combined with camphor. Camphorated naphthol is formed by adding 1 part of naphthol to 2 parts of camphor, and is a colorless, syrupy liquid, well adapted for use as a local antiseptic. It may be beneficially employed in wounds, ulcers, sinuses, diphtheria, tubercular laryngitis, and, rubbed up with lard, it forms a valuable application in many diseases of the skin. Inhalations of beta-naphthol are of service in pharyngitis, chronic nasal catarrh, hay asthma, whooping-cough, and chronic bronchitis.

Beta-naphthol is administered internally chiefly as a means of securing antisepsis. Being almost insoluble, it is one of the best agents at our command for disinfection of the alimentary tract. In typhoid fever it mitigates the severity of the disease and reduces the rate of mortality. The stools are deodorized, tympanites lessened, and the tongue moistened. Grave delirium rarely makes its appearance. These results, announced by Professor Bouchard, have been amply confirmed by the writer and numerous observers at home and abroad. Dr. Mitchell Bruce* concludes that the duration of typhoid fever is shortened, and the tendency to secondary complications overcome, by the use of beta-naphthol. The testimony of Dr. Petresco, of Bucharest, a zealous therapeutist, is strongly to the same effect.† The remedy is equally valuable in the typhoid fever of young children. When the diarrhœa is profuse it is advisable to combine naphthol with the salicylate of bismuth, thus:—

℞ Naphthol. beta,
Bismuth. salicylat., ... āā ʒij.
M. et div. in chart. no. xv.
Sig.: A powder every hour or as required.

Good results are derived from the internal administration of this drug in diphtheria, erysipelas, and scarlatina. In flatulent dyspepsia, chronic, gastric, or intestinal catarrh, and dilatation of the stomach, it is no less efficacious. Professor Dujardin-Beaumetz recommends, in dilatation of the stomach, the following combination:—

℞ Naphthol. beta,
Bismuth. salicylat.,
Magnes. calcinat., ... āā gr. cl.
M. et div. in chart. no. xxx.
Sig.: One powder before each of the two principal meals.

In obstinate constipation, connected with disturbed digestion, the author has witnessed excellent results from ½- to 3- grain doses of beta-naphthol given three or four times a day. Beta-naphthol is likewise often of utility in chronic cystitis.

Beta-naphthol with salicylic acid (sali-naphthol) is reported to act similarly to salol, without being as toxic, in articular rheumatism, in doses of from 4 to 8 grains.

Beta-naphthol is well given in the form of tablet triturates. Milk, glycerin, and mucilage are also excellent vehicles for its administration.‡

* Practitioner, December, 1888.

† J. Petresco: Recherches cliniques et expérimentales sur l'Antisepsie Médicale, January, 1889.

‡ See papers by the author, "Naphthol: its Medicinal Use and Value," Journal of the American Medical Association, October, 1883; Therapeutic Gazette, October 15, 1889.

Hydro-Naphthol, as the writer and others have already shown,* exists only as an impure form of beta-naphthol. It is a quasi-proprietary preparation.

NEROLI OLEUM.—Oil of Neroli, Volatile Oil of Orange-Flowers.

Pharmacology.—The oil of neroli is distilled from the flowers of Citrus aurantium and Citrus vulgaris (Aurantiaceæ). Dissolved in alcohol (2 per cent.) it forms the spirit of neroli, used for flavoring. The oil of neroli is obtained in the distillation of orange-flower water, but is not the same volatile oil as that contained in the water (see Aqua Aurantii Florum, page 462), and orange-flower water cannot be made from the oil of neroli.

NICOTINA.—Nicotine.

Nicotine is an alkaloid obtained from tobacco. See Tabacum.

NITROGLYCERINUM.—Nitro-Glycerin. See Glonoinum, page 439.

NUX VOMICA (U. S. P.).—**Nux Vomica, Poison-Nut.**

Preparations.

Abstractum Nucis Vomicæ (U. S. P.).—Abstract of Nux Vomica. *Dose*, ss-j.

Extractum Nucis Vomicæ (U. S. P.).—Extract of Nux Vomica. *Dose*, gr. ¼-½.

Extractum Nucis Vomicæ Fluidum (U. S. P.).—Fluid Extract of Nux Vomica. *Dose*, ♏i-v.

Tinctura Nucis Vomicæ (U. S. P.).—Tincture of Nux Vomica (20 per cent.). *Dose*, ♏v-xx.

Strychnina (U. S. P.).—Strychnine. *Dose*, gr. $\frac{1}{60}$-$\frac{1}{20}$.

Strychninæ Sulphas (U. S. P.).—Sulphate of Strychnine. *Dose*, gr. $\frac{1}{60}$-$\frac{1}{12}$.

Pharmacology.—Nux vomica is the seed of Strychnos nux vomica (Loganiaceæ), of East Indies. The seeds are disk-shaped, about an inch in diameter, covered with silky hairs, of a greenish-gray color, and grayish-white internally; very tough, and difficult to powder. Odor none, but the taste is very bitter. **Strychnine** ($\frac{1}{4}$ to $\frac{3}{8}$ per cent.), and **Brucine** ($\frac{1}{2}$ to 1 per cent.) with **Igasuric acid,** are the important constituents, besides fixed oil, tannin, etc. A third alkaloid, isolated by Desnois, in 1853, and termed **Igasurin,** is crystallizable, bitter to the taste, and shares the poisonous properties of the other alkaloids. The powdered drug varies in alkaloidal strength, and in using the fluid preparations it is necessary to have them standardized in order to insure uniformity of physiological and therapeutic effect. Strychnine represents the medicinal activity of nux vomica. Strychnine crystallizes out of alcohol in the form of colorless prisms and dissolves in pure sulphuric acid without change of color. If a few drops of this solution be placed upon a white

* See papers by the author, "The Imputations on Beta-Naphthol," and "The Beta-Naphthol *vs.* Hydro-Naphthol Contention," Journal of the American Medical Association, July 14, 1888, and May 11, 1889.

plate and an equal quantity of potassium-bichromate solution be cautiously brought into contact with its edge, a beautiful and characteristic play of colors is produced, ranging through blue, purple, crimson, and red-brown. This color change is distinctive and is available as a delicate test for strychnine. Morphine obscures this test, and hence, if present, should first be removed by means of an alkaline mixture of chloroform. A physiological test is also utilized in cases of suspected poisoning; $\frac{1}{1000}$ grain of strychnine sulphate in a drop of water, applied to the dried skin of a frog, will produce spasm in about ten minutes. Brucine, which gives rise to a similar physiological reaction, is likewise a crystalline body, soluble in 320 parts of cold or 150 parts of boiling water, has a strongly bitter and persistent taste, and, although generally resembling strychnine in its properties, will sometimes destroy life without the occurrence of convulsions. Strong sulphuric acid strikes a blood-red or scarlet color with brucine and its salts. Igasurine occurs in colorless, silky prisms, is more soluble in water than either of the other alkaloids, has a similar bitter taste and toxic action, is colored rose-red by strong sulphuric acid and a deeper red by nitric acid. It is soluble in water and in alcohol, making intensely bitter preparations, thus rendering the pill form preferable for administration. The abstract of nux vomica is a good preparation, and should be more frequently used.

Physiological Action.—In minute doses, repeated three or four times daily, which is the best way to get its tonic effect, strychnine increases the appetite, stimulates secretion, improves digestion, and exalts the vital powers, improving also sight and hearing. Strychnine is a stimulant to the respiratory centre, also to the heart and vaso-motor centres. Arterial pressure is raised and the pulse becomes more slow. The pupil dilates under its influence. Peristalsis is increased and the bowels somewhat loosened; even diarrhœa may result from full doses. Strychnine stimulates the genito-urinary system, has some influence upon the muscular tissue of the uterus, favors the occurrence of the menses, increases the venereal appetite, and excites erections. The functions of the spinal cord are exalted as well as stimulated, according to Biernacki,* and especially those of the anterior gray columns, but a very large dose paralyzes and destroys them. The brain is not affected directly until the accumulation of carbonic-acid gas in the blood causes coma and insensibility. This drug is absorbed rather slowly by the stomach, more rapidly by the rectum. Its toxic effects are, consequently, more promptly manifested after injection into the rectum than when administered by the mouth. Strychnine is slowly excreted by the kidneys, but elimination is more rapid in children than in old people. Strychnine

* Therap. Monatshefte, August, 1890.

also escapes in the saliva. This drug, therefore, tends to accumulate in the system, and produce muscular stiffness, cramps, and other symptoms of toxic action. On account of its slow rate of absorption and elimination, its exhibition should be occasionally suspended for a time, lest a dangerous quantity should accumulate within the system. Strychnine is a local irritant. It possesses some antiseptic virtue, and, to a certain extent, inhibits the movements of leucocytes, though far feebler in this respect than quinine.

Poisoning by Strychnine.—When a large dose ($\frac{1}{12}$ to $\frac{1}{2}$) is given to an adult and absorbed, the face is drawn into a grin (risus sardonicus), the lower jaw becomes immovable, the neck rigid, the pupils dilate, the reflexes are heightened so that the muscles contract spasmodically and painfully; then paroxysmal attacks of tonic contraction, especially of the extensor muscles of the body, in which the patient assumes the position of opisthotonos, occur; finally, the muscles of respiration become tetanically fixed, and death occurs from apnœa and carbonic-acid accumulation in the blood, producing narcosis. The fatal result may ensue in a few minutes if the dose be a large one. It acts more rapidly and effectively when given by the rectum, or hypodermatically, than when swallowed.

As is the case with other active poisons, the lethal dose varies within considerable limits. Death has resulted from $\frac{1}{2}$ grain of strychnine or 3 grains of extract of nux vomica; on the other hand, as much as 6 grains of strychnine sulphate have been taken without fatal effect. One-third of a grain of strychnine by the mouth, or $\frac{1}{20}$ grain subcutaneously injected, must be considered a dangerous quantity.* A very instructive case, showing the after-effects which may be caused by strychnine poisoning, has been published by Dr. G. Honigmann, from the clinic of Professor Riegel, of Giessen.† A man who suffered from the classical symptoms of this accident had recovered under the liberal use of chloral hydrate. At the expiration of twenty hours after taking the poison, only a minute quantity of urine had been voided. Albumin was unmistakably present. There was abdominal pain with constipation. During the second night a small quantity of clear urine was passed which contained an abundant precipitate of albumin. It deposited a sediment in which were detected both white and red blood-corpuscles and a few hyaline casts. The pain and constipation continued and the pulse remained slow and strong. On the fourth day albuminuria persisted; the urine was still scanty; the sediment rich in blood-corpuscles, hyaline and epithelial casts, with renal epithelium. The kidneys began to resume their functions upon the

* Materia Medica and Therapeutics, by Charles D. F. Phillips, M.D., Phila., 1886, p. 456.

† Deutsche Medicinische Wochenschrift, May 30, 1889; Medical Bulletin, October, 1889, p. 324.

fourth and fifth days, after the skin had been roused to free perspiration. The albumin, casts, and cells began to decrease at the same time, but did not finally disappear until the fourteenth day. During all this time the pulse remained very slow. The renal insufficiency and albuminuria were probably due to limitation of the circulation through the kidney by contraction of its vessels. But the composition of the sediment indicated that a more permanent injury had occurred. The reporter plausibly conjectured that the renal epithelium had been affected, giving rise to an acute glomerulo-nephritis.

Diagnosis of Strychnine Poisoning.—The convulsions do not resemble those occurring during the epileptic paroxysm, because they are always tonic and never clonic in character. They may be distinguished from those of tetanus by the history of the case and by the symptoms. In tetanus, the muscles of the lower jaw are first attacked ; locked-jaw exists for some time before the other muscles are involved ; moreover, in tetanus they do not entirely relax; some remain rigid; whereas, in strychnine poisoning, all the muscles are affected almost simultaneously, and then are relaxed until the next paroxysms. In what is known as tetany, the muscles about the neck are usually not affected, but there is persistent rigidity of other muscles. In hysterical convulsions the muscular contractions are not painful, and the patient does not retain full sensation, nor full consciousness, but is in a dreamy or stupid condition. In convulsions of hydrophobia the patient is semi-delirious, there are no tonic spasms of muscles or cramps, and there is a history of wound from an animal.

Antidotes and Treatment.—Tannin is the chemical antidote to nux vomica and to strychnine. The antidote should be given immediately, and a convenient form is tea or coffee that has been standing for an hour or more, given grounds or leaves and all, washing out the stomach afterward with warm water or coffee. After spasm has developed, the introduction of the tube may excite convulsions. In order to obviate this occurrence the patient should be placed under the influence of nitrite of amyl or chloroform. The same caution applies to catheterism. The physiological antidotes are bromide of potassium, chloral, and physostigmine, or Calabar bean. Nitrite of amyl, chloroform, or ether inhalations may be cautiously employed at the onset of the paroxysms, and artificial respiration practiced. The catheter should be used frequently, and the bowels thoroughly evacuated with croton-oil. The physiological antidotes may be given by the rectum. If relaxation does not occur, nitrite of amyl may be injected hypodermatically. Animal charcoal and fats are useful adjuvants. Sanquirico prefers paraldehyde to chloral, and warmly recommends intra-venous injections of a considerable quantity of an 8-per-cent. soda solution, which produces active diuresis and elimi-

nation. Opium and conium may also be brought into requisition as physiological antidotes. Dr. Whitla* writes with decided approval of tobacco† and alcohol in poisoning from strychnine. He states that he would not hesitate to use alcohol alone in a desperate case, and believes that it will afford the best chance of success in dealing with the spasms, but poisonous doses must be boldly administered by the mouth and rectum. Chloroform has been given by the mouth (ʒi–ij) successfully.

Siebold, in some experiments conducted upon himself as to the physiological action of strychnine,‡ reports that tannin in 10-grain doses was valueless as an antidote. Charcoal in 1-ounce doses had some slight effect, injections of morphine were useful, but chloral hydrate and chloroform sufficed to entirely prevent the muscular contractions, when administered in time.

Therapy.—Nux vomica is not applied externally, and, although an oleate of strychnine is made, yet it has little, if any, use on account of its uncertainty with regard to absorption. Strychnine not being very soluble, its salts, sulphate, or acetate, may be used hypodermatically in the treatment of paralysis (gr. $\frac{1}{80}$ to $\frac{1}{60}$), or injected into the tissues around the eye for amaurosis in tetanus,§ as an antidote to snake-poison‖ and tobacco-alcohol amblyopia. Dr. Bancroft,¶ after experiments on guinea-pigs, declares that hypodermatic injection of strychnine for snake-poison is useless. Internally, the tincture of nux vomica does good as a bitter tonic, and in sick-headache from disordered stomach Ringer gives it in 1-drop doses in a teaspoonful of water, every ten or fifteen minutes, until 10 drops have been taken.

Cases of nausea and vomiting of pregnancy, not infrequently, yield to minute doses of the tincture, a drop, or a fraction of a drop, being given in water, and repeated in an hour or two hours. This preparation, likewise, does excellent service in the morning vomiting to which drunkards are subject. Nux vomica, indeed, fulfills more than one indication in this class of patients. It is beneficial in the chronic gastritis of alcoholism, and affords support to the system when the accustomed alcoholic stimulus is suddenly withdrawn. The poor appetite and digestion, the miserable sense of weakness, the insomnia and tremor, are

* *Op. cit.*, p. 338.

† "Chloroform should be used in strychnine poisoning; not tobacco." Francis L. Haynes, M.D., Phila. Med. Times, vol. xiv, p. 504.

‡ The Chemist and Druggist, September 6, 1890.

§ "Strychnine as a Preventive of Tetanus," by Dr. Peyraud, Bullétin Médical, September 2, 1890.

‖ "Strychnine as an Antidote to Snake-Poison," by Dr. Muller, Druggists' Circular and Chemical Gazette, January, 1891; "Snake-Poison and its Antidotes," by T. Lauder Brunton, M.D., F.R.S., British Medical Journal, January 3, 1891.

¶ "Strychnine in Snake-Bite." Journal of American Medical Association, February 21, 1891.

relieved by the tincture of nux vomica. At the same time, and especially being combined with capsicum, it diminishes the craving for drink, and is of value in assisting to break up the habit. The gastric catarrh dependent upon chronic disease of other organs, as bronchial tubes, heart, or liver, is also alleviated, as Ringer has pointed out, by the administration of 1 or 2 drops of the tincture in a teaspoonful or two of water every two hours, or oftener, for twenty-four to forty-eight hours.

In atonic dyspepsia and insufficient secretion, nux vomica is useful in pills, with quinine and some carminative. Owing to its effects upon motor nerves, it is valuable in constipation produced by defective muscular activity, and also in the form due to lead poisoning.

In the former condition, the contractions of the lower bowel become so energetic that, according to Whitla, the stools are occasionally much altered in size, and may be seen to present the attenuated appearance observed in stricture of the rectum. The effects of nux vomica in constipation are often enhanced by a combination with a purgative and chalybeate.

For constipation, nux vomica can be commended combined as follows:—

℞ Extracti nucis vomicæ,	gr. v.
Extracti belladonnæ alc.,	gr. iij.
Extracti cascaræ sagradæ,	gr. xv vel xxx.

M. et ft. pil. no. xxx.
Sig.: A pill after each meal.

℞ Extracti nucis vomicæ,	gr. v.
Pulveris ipecacuanhæ,	gr. x.
Extracti hyoscyami alc.,	gr. xx.

M. et ft. pil. no. xx.
Sig.: A pill three times a day.

Waugh recommends for constipation this prescription containing nux vomica:—

℞ Extracti nucis vomicæ,	gr. v.
Aloës purificat.,	gr. v.
Ext. belladonnæ alc.,	gr. iij.
Oleoresina capsici,	gr. ij.

M. et ft. pil. no. xx.
Sig.: One pill after each meal until two passages occur in a day, when half pills are to be taken; and the reduction is to be continued until the habit of regular evacuations has been formed.

Atony of the large intestine leads to prolapsus ani, and here also the tincture of nux vomica is of advantage, both by internal administration and local injection. Phillips has seen excellent results, in hæmorrhoids, from the tincture. In opposite conditions of the intestine, and for

different reasons, strychnine is remedial. In nervous or atonic diarrhœa it materially assists the action of other remedies, and may be thus prescribed with advantage :—

℞ Strychninæ sulphat., ... gr. ss.
Acidi sulphurici aromat., ... fℨv.
Aq. hamamelidis dest., ... q. s. ad f℥iv.
M. et ft. sol.
Sig.: A teaspoonful in water every three hours.

In dysentery attended by unusual prostration and tympanites this remedy has proved of advantage. In combination with a mineral acid it has sometimes seemed to do good in Asiatic cholera.

Strychnine is one of the best of the cardiac stimulants in failing heart or weakness of the circulation. Prof. Thomas G. Morton uses it in surgical shock. Weakness of the heart due to depressed nerve-force and dilatation of the heart are materially benefited by strychnine. It is a good plan to give this remedy sometimes in combination, and again alternating, with digitalis. Iron is often profitably added to the combination, as :—

℞ Strychninæ sulph., ... gr. ⅓.
Tinct. ferri chloridi, ... fℨij.
Infus. gentianæ, ... q. s. ad f℥vj.
M. Sig.: Tablespoonful in water three times a day.

In fatty heart it is capable of service, but should be given with circumspection, since it will sometimes induce a nervous and sleepless state, which is decidedly harmful to the patient. In emphysematous asthma it is especially serviceable. The various forms of muscular paralysis—hemiplegia, paraplegia, diphtheritic paralysis, wrist-drop—are well treated by strychnine internally, or hypodermatically (gr. $\frac{1}{120}$) thrown deeply into the affected muscles, in conjunction with electricity. It has also been employed with success in infantile palsy and writers' cramp. In progressive lead-palsy, strychnine stops the advance of the disease if used in full doses, a careful watch being kept up for toxic symptoms and potassium iodide being given simultaneously on account of its eliminative effects. Other forms of paralysis in which this agent renders conspicuous service, are torticollis; mercurial, malarial, and hysterical paralysis; neurasthenia from sexual excess and aphonia due to paralysis of the vocal cords. In conjunction with out-door life and calisthenics, nux vomica is useful in lateral curvature of the spine. In atony of the bladder, leading to incontinence or retention, a combination of strychnine and electricity forms the most valuable restorative means at our command.

In dyspnœa and shortness of breath attending emphysema, winter cough, or phthisis, strychnine is useful; also in maintaining respiration

in narcotic poisoning, as from opium. Nux vomica is of considerable value in the treatment of phthisis. By promoting digestion it maintains nutrition; it deepens respiration and exerts a beneficial effect upon the cough. It relieves the vomiting to which consumptive subjects are liable, and, as Murrell has shown, has some power to check night-sweats. When given with the latter object in view it is best combined with aromatic sulphuric acid. Pinnoy has lately reported good results from the hypodermatic injection of the arseniate of strychnine in 4 cases of phthisis; 4 to 15 minims of a ½-per-cent. solution in liquid vaseline were given daily.*

In amaurosis and failing eye-sight the tincture of nux vomica may be administered, gradually increasing the dose and watching its effects in order to prevent toxic symptoms. In delirium tremens large doses of tincture of nux vomica are not only well borne, but are rapidly curative.

Strychnine is not to be used while neuritis exists, or during the period of vascular reaction after apoplexy. In hypertrophy of the heart it should be given cautiously. In neuralgia due to impaired nutrition we may employ the following pill:—

℞ Zinci phosphid.,	gr. $\frac{1}{10}$.
Ext. nucis vomicæ,	gr. ¼.

M. et ft. pil.
Sig.: To be taken every three or four hours.

In simple indigestion and atonic dyspepsia use:—

℞ Abstract. nucis vomicæ,	gr. vj.
Quininæ hydrochlorat.,	gr. xxiv.
Pulv. capsici,	♏j.
Ext. gentianæ,	ʒj.

M. et ft. pil. no. xxiv.
Sig.: Take one or two before meals.

In tobacco amaurosis, de Schweinitz recommends:—

℞ Tr. nucis vomicæ, . . . fʒij.

Take 3 drops three times daily, increasing 2 drops daily until physiological effects are obtained.

℞ Tr. nucis vomicæ,	fʒj.
Acid. nitro-muriatic. dilut.,	fʒj.
Spiritus chloroformi,	fʒj.
Infus. gentianæ,	q. s. ad f℥vj.

M. Sig.: Take a tablespoonful or two after each meal for flatulent colic.

Strychnine sulphate, given hypodermatically in doses of $\frac{1}{120}$ grain, is a very efficacious remedy in gastralgia and visceral neuralgia in

* Annual of the Universal Medical Sciences, 1890, vol v, page A-96.

general, as well as in the milder forms of angina pectoris. The same treatment has also been recommended for infra-orbital neuralgia. The tincture has been given with good results in those cases of chorea which arise about the age of puberty, and seem to have no connection with rheumatism, as well also in some cases of chorea major. In idiopathic epilepsy of ill-nourished patients, nux vomica will frequently afford a decided relief. Hæmatosis is promoted by nux vomica, and hence it is of value in the management of anæmia, chlorosis, amenorrhœa, and dysmenorrhœa. It is serviceable in purpura and in post-partum hæmorrhage. By promoting capillary circulation it is beneficial in cases of habitual coldness of hands and feet. Strychnine aids in overcoming subinvolution of the uterus. It is useful in some cases of spermatorrhœa and impotence.

OLEUM ÆTHEREUM (U. S. P.).—**Ethereal Oil.** See Æther, page 402.

OLEUM MORRHUÆ (U. S. P.).—**Codliver-Oil.** See Morrhua Oleum, page 751.

OLEUM MYRCIÆ (U. S. P.).—**Oil of Myrcia** or **Bay.** See Myrcia, page 756.

OLEUM OLIVÆ (U. S. P.).—**Olive-Oil, Sweet-Oil.**

Pharmacology.—Sweet-oil is a fixed oil expressed from the ripe fruit of Olea Europea (Oleaceæ). It consists largely of **Olein** (more than two-thirds), with some solid fat, **Tripalmitin.** The best or virgin oil is obtained from the crushed ripe fruit, by expression without heat; a second quality is obtained by the addition of hot water to the same crushed fruit and expressing again. An inferior grade is made from the residue, after boiling, with the aid of very strong pressure. The best is nearly tasteless and without color, the second has more taste and color, and the third is dark and more or less rancid, with strong odor. The better varieties are used upon the table, as salad-oil, and also in pharmacy. Olive-oil enters into lead plaster and diachylon ointment. Cottonseed-oil and peanut-oil are used very largely as substitutes, but have not the agreeable flavor of olive-oil.

Physiological Action and Therapy.—Olive-oil is a lubricant, and is added to poultices as an emollient in pneumonia and in skin diseases. Carbolized oil (1 to 24) is a valuable dressing for wounds. Internally, olive-oil is nutritious and laxative, and is a purgative for infants (in doses of a teaspoonful). During its use, the infant may pass lumps of white fat, resembling beans, composed of undigested **tripalmitin.** In adults, it is a useful remedy in all forms of irritant poison-

ing, except that by phosphorus; it is also a good enema. Given internally, in the dose of ½ ounce to 1 ounce, olive-oil will often relieve simple constipation in adults, especially when the condition has been produced by opium. It may be employed with advantage as a demulcent laxative in hæmorrhoids and fissure of the anus. Much has been written of late concerning the value of this oil in gall-stone and hepatic colic. It has been freely administered in large doses (3 to 6 ounces) and was thought to aid in the expulsion of the concretions. While it seems to have some power to alleviate pain, it has no other influence, and the stones supposed to be passed during its use have been shown to be merely fatty masses.

In scarlatina and other febrile affections, the application of oil to the skin reduces the temperature. In the desquamative stage of scarlatina, it is of prophylactic utility by restraining the dispersion of scales through the atmosphere. Olive-oil has likewise been used by inunction in wasting diseases, and is of undoubted service, though of less value than codliver-oil. Insects, which occasionally find their way into the external auditory meatus, may be easily removed by dropping a small quantity of this oil into the canal. Dr. C. R. Earley administers sweet-oil freely in cases of snake-bites, and says it has never failed in his hands.

A **white emulsion** is made by rubbing up powdered gum acacia (308 grains) with olive-oil (3 ounces), and when thoroughly mixed gradually adding orange-flower water and syrup (of each, 2 ounces). It is used, either alone or in combination with opium, in treating dysentery, tenesmus, irritation of the bowels, etc. **Lipanin,** a combination of olive-oil and oleic acid, has already been referred to. It is recommended by von Mering as a substitute for codliver-oil, but it is too expensive as compared with the other, and is not so serviceable as an alterative. (See page 751.)

OLEUM RICINI (U. S. P.).—**Castor-Oil.** See Ricinus.

OLEUM SANTALI FLAVI (U. S. P.).—**Oil of Sandal-Wood.** See Santalum.

OLEUM SUCCINI (U. S. P.).—**Oil of Amber.** See Succinum.

OLEUM THEOBROMÆ (U. S. P.).—**Cacao-Butter.** See Theobromæ.

OLEUM THYMI (U. S. P.).—**Oil of Thyme.** See Thymus.

OLEUM TIGLII (U. S. P.).—**Croton-Oil.** See Tiglium

OLEUM ZEÆ MAIDIS.—**Oil of Indian Corn.** See Zea Mays.

OPIUM (U. S. P.).—**Opium.**
Dose, gr. ¼–iij.

Preparations.

Opium Denarcotisatum (U. S. P.).—Denarcotized Opium (morphine, 14 per cent.). *Dose*, gr. ss–j.

Extractum Opii (U. S. P.).—Extract of Opium (morphine, at least 20 per cent.). *Dose*, gr. ¼–½.

Opii Pulvis (U. S. P.).—Powdered Opium (morphine, 12 to 16 per cent.). *Dose*, gr. ss–j.

Pilulæ Opii (U. S. P.).—Pills of Opium (each 1 gr. powdered opium). *Dose*, one pill.

Emplastrum Opii (U. S. P.).—Opium Plaster (extract, 6 per cent.).

Trochisci Glycyrrhizæ et Opii (U. S. P.).—Troches of Liquorice and Opium, Wistar's Cough Lozenges (extract, 5 per cent., or gr. $\frac{1}{20}$ extract of opium in each troche). *Dose*, j to x.

Pulvis Ipecacuanhæ et Opii (U. S. P.).—Powder of Ipecac and Opium, Dover's Powder (ipecac and opium, of each 1 part, sugar of milk 8). *Dose*, gr. x.

Tinctura Opii (U. S. P.).—Laudanum (opium, gr. j in ♏xiij). *Dose*, ♏i–xx.

Tinctura Opii Deodorata (U. S. P.).—Deodorized Tincture of Opium (opium, gr. j to ♏xiij). *Dose*, ♏i–xx.

Tinctura Ipecacuanhæ et Opii (U. S. P.).—Fluid Dover's Powder. *Dose*, ♏v–x.

Tinctura Opii Camphorata (U. S. P.).—Paregoric Elixir (opium, gr. j in f℥ss). *Dose*, fʒj–℥ss.

Vinum Opii (U. S. P.).—Wine of Opium (10 per cent.). *Dose*, ♏v–xx.

Acetum Opii (U. S. P.).—Vinegar of Opium (10 per cent.). *Dose*, ♏v–xx.

Mistura Magnesiæ et Asafœtidæ (U. S. P.).—Dewees's Carminative (mag. carb. 5, tr. asafœtida 7, tr. opium 1, sugar 10, water q. s. ad 100 parts). *Dose*, fʒss–iv.

Mistura Glycyrrhizæ Composita (U. S. P.).—Compound Liquorice Mixture, Brown Mixture (paregoric 12, antimonial wine 6, sweet spirit of nitre 3, extract liquorice, sugar, acacia, of each 3 parts, water 70 parts). *Dose*, fʒj–f℥ss.

Codeina (U. S. P.).—Codeine, gr. ¼–ij. (See Codeina, page 559.)

Narcotinæ Hydrochloras.—Hydrochlorate of Narcotine. *Dose*, gr. ii–x.

Morphina (U. S. P.).—Morphine. *Dose*, gr. $\frac{1}{10}$–½.

Morphinæ Acetas (U. S. P.).—Acetate of Morphine. *Dose*, gr. ⅙–½.

Morphinæ Hydrochloras (U. S. P.).—Hydrochlorate of Morphine. *Dose*, gr. ⅙–½.

Morphinæ Sulphas (U. S. P.).—Sulphate of Morphine. *Dose*, gr. ⅙–½.

Pulvis Morphinæ Compositus (U. S. P.).—Compound Morphine Powder, Tully's Powder (morphine sulphate, 1 part; liquorice, camphor, and calcium carbonate, of each 20 parts). *Dose*, gr. v–xv.

Morphinæ Oleatum.—Oleate of Morphine (10 per cent.). External use.

Tinctura Chloroformi et Morphinæ (B. P.).—Tincture of Chloroform and Morphine. (See Chlorodyne, page 535.) *Dose*, ♏v–x.

Mistura Opii et Ipecacuanhæ Composita.—Swedish Cholera Drops, Thielemann's Cholera Drops (oil of peppermint, 1 oz.; alcohol, 8 oz.; tincture of opium and saffron [Sydenham's laudanum], 3 oz.; tinct. of opium, 8 oz.; tinct. of valerian, 13½ fl.oz.) *Dose*, fʒi–ij.

Confectio Opii (Ph. 1870).—Confection of Opium (powd. opium 1, aromatic powder 12, honey 28 parts). *Dose*, gr. x–xx.

Papaveris Capsulæ.—Poppy-Capsules (of uncertain and variable narcotic effect).

Syrupus Papaveris.—Syrup of Poppy-Capsules (of variable narcotic strength). *Dose*, to a child, fʒss–j; to an adult, f℥ss–j.

Syrupus Rhœados.—Syrup of Red Poppy-Flowers (no narcotic effect). Used as a vehicle.

Oleum Papaveris Seminis.—Poppy-seed-Oil (a bland oil, used to adulterate olive-oil and resembling it in character).

Pharmacology.—The concrete, milky exudation, obtained in Asia Minor by incising the unripe capsules of Papaver somniferum (Papaveraceæ), constitutes **Opium,** which, in its inspissated form, occurs in chestnut-colored masses or lumps, with an earthy, narcotic odor and bitter taste. In its commercial condition, as a moist, soft solid, it should contain not less than 9 per cent. of morphine; it loses about 20 per cent. of its weight in the process of drying. When dried and powdered, the pharmacopœia directs that it shall contain not less than 12 per cent., nor more than 16, of morphine. The principal properties of crude opium are extracted by water, alcohol, and dilute acid, but not by ether. When broken it should exhibit a notched fracture, and should leave an interrupted stain when drawn across white paper. Since all commercial opium contains more or less admixture of foreign material, or adulteration, the best preparation is the denarcotized opium, obtained by dissolving and removing narcotine and other matters soluble in ether, and standardizing the product to the uniform strength of 14-per-cent. morphine. By employing denarcotized opium in making Dover's powder a superior product is obtained, less disagreeable to the taste and less likely to cause nausea than that made from the ordinary powdered opium. A syrup of opium and ipecac may also be made with denarcotized opium, so that each teaspoonful will represent 10 grains of Dover's powder. The preparations that pharmacy offers to the physician of this ancient and valuable remedy are innumerable, but they are all dependent for their activity upon the presence of certain proximate principles. It had been long suspected that a **vis dormitiva,** or narcotic element, existed in opium and gave it medicinal value, but it was not until 1817 that a crystalline body was isolated by Sertürner, which he correctly considered as the salt of an organic acid to which he gave the name of **Meconic acid.** The sleep-producing principle he named morphium in honor of the drowsy god, but this has been since changed to **Morphine,** in order to make it conform in terminology to the other organic alkaloids of the pharmacopœia. Since then, other alkaloids and proximate principles have been separated from opium, some of which possess narcotic power, some have not, and one, at least, is a tetanizer resembling strychnine. The principal constituents and alkaloids are as follow:—

Morphine (at least 9 per cent. in crude opium); the principal narcotic constituent. Codeine ($\frac{1}{2}$ per cent.); about half the narcotic strength of morphine, but more calmative. Narcotine (2 to 10 per cent.); no narcotic effects; antiperiodic. Thebaine or paramorphine (less than $\frac{1}{4}$ per cent.); convulsive agent and spinal excitant. Narceine (0.02 per cent.); resembles morphine, but has less disagreeable after-effects. (A new and more soluble narceine has recently been prepared by Dr. Laborde and M.

Duquesnel.*) Papaverine (1 per cent.); narcotic and convulsant. Also, cryptopine, pseudo-morphine, protopine, cotomine, laudanine, codamine, rhœadine, meconidine, laudanosine, lanthopine, and gnoscopine in small amounts, with neutral principles, meconin, meconoisin, and porphyroxin, and meconic and lactic acids.

It is probable that these principles exist in a highly complex arrangement in opium, and that separately none of them completely represents the drug; possibly some of them are derivatives of the others, and not separate compounds. **Apomorphine** is a derivative of morphine, devoid of narcotic effect, causing prompt emesis. (See page 448.)

Some of the chemical reactions and tests of opium are interesting. Solutions containing meconic acid turn red in contact with the tincture of the chloride of iron, and the same reagent turns morphine blue, afterward changing to green; nitric acid turns morphine to blood-red, changing to yellow. According to Wormley, the nitric-acid test is capable of detecting $\frac{1}{10000}$ grain of morphine in the dry state. Opium preparations, in solution, afford precipitates with solutions of many of the metals in the form of an insoluble meconate. The alkaloids are precipitated by the addition of an alkali or tannic acid. This is of importance in prescription-writing. It should also be stated that there is present a small proportion of glucose in gum opium, which chemically makes it incompatible with nitrate of silver, and pills containing these in combination may explode. The formerly much used lead-water and laudanum mixture is dependent for some of its effects upon the extemporaneously formed meconate of lead, which is of a yellow color and is unsightly and dirty; dilute lead-water, with alcohol, will probably answer the purpose nearly as well and is colorless.

Morphine occurs in the form of colorless, flat, six-sided prisms, destitute of smell, but having a very bitter taste. It melts at about 330° F., and is destroyed by more elevated temperatures, is insoluble in cold water and ether, sparingly soluble in boiling water, more freely soluble in alcohol and chloroform. The solutions of morphine possess an alkaline reaction. It dissolves without decomposition in solution of potassium. On account of its insolubility in water it is employed for medicinal purposes in the form of its soluble salts.

Codeine is present in opium combined with meconic acid, and is separated from morphine by means of an alkaline solution. This is a colorless, crystalline substance, anhydrous or hydrated, depending upon whether it crystallizes from an ethereal or aqueous solution. Its solutions are bitter to the taste and of an alkaline reaction. Codeine dissolves in water, alcohol, ether, and chloroform. In this country it is generally

* Therapeutic Gazette, September 15, 1890, p. 639.

administered in the form of the sulphate of codeine. **Apocodeine** is a derivative of codeine, obtained by heating codeine hydrochlorate with a concentrated solution of chloride of zinc.

Physiological Action.—Opium is a stimulant, narcotic, anodyne, antispasmodic, and intoxicant. Its taste is bitter and somewhat acrid; it gives rise to a sensation of dryness in the mouth and throat, and subsequently to a viscid secretion, with huskiness of the voice. It restrains the movements and checks the secretions of the stomach and intestinal canal. As a result of his experiments, Nothnagel concluded that opium in moderate doses stimulates the inhibitory nerves of the intestine, but paralyzes them when given in excessive doses. This accords with the observed fact that under the influence of this drug constipation is not infrequently followed by exaggerated peristalsis and free evacuation of the bowels. The pancreatic and hepatic secretions are lessened, and the stools sometimes become clay-colored under the influence of opium.

The drug is not perfectly represented by morphine, and many persons are able to take some of the opium preparations with good results, although made sick by morphine. In discussing the physiological action, however, it will lead to no confusion if we consider them together. In order to produce its characteristic effects, opium, or its active principles, must be absorbed into the blood and carried to the motor and sensory and higher nervous centres, and to the terminal end-organs of nerves. Having been carried to the brain and cord, the functions of the ganglion-cells are at first stimulated, and secondarily depressed or inhibited, probably owing to the salts diffusing through the cell-wall and entering temporarily into combination with the protoplasm. Subsequently they are removed by fresh supplies of blood and carried to the excretory channels, particularly the alimentary canal and kidneys. E. Tauber found that when morphine was administered hypodermically to dogs, for several days, he was able to recover 41.3 per cent. of the drug from the fæces.* Alt had already shown that after injection, subcutaneously, morphine could be detected in the stomach. Morphine does not appear to be destroyed or materially altered in passing through the animal organism. It seems probable, however, that small amounts of the alkaloid are decomposed within the body, while larger quantities escape without change Opium is likewise eliminated by the skin and kidneys. The paper of Drs. R. Stockman and D. B. Dott on "The Pharmacology of Morphine and its Derivatives" (*British Med. Journal*, July 26, 1890), and that read by Dr. Stockman "On the Pharmacology of Some Bodies Derived from Morphine" (*Transactions Ninth International Med. Congress*, Washington,

* "Ueber das Schicksal des Morphins im thierischen Organismus," Archiv für Experimentelle Pathologie und Pharmakologie, July 24, 1890.

1887, vol. 3, p. 47), contain the results of a laborious series of investigations in a very interesting field, and form a valuable contribution to our knowledge of the influence of chemical change on physiological action, as well as to the pharmacology of morphine. Their conclusions only can be stated here; for details the reader is referred to the original sources. Morphine primarily affects the nervous system; in small doses it depresses the action of the spinal cord; in larger doses it stimulates it, even to the production of convulsions. The late appearance usually of increased reflexes is accounted for on the ground that at first only a small quantity of morphine reaches the cord. It has been held by some observers that morphine is capable of directly paralyzing the motor endings of nerves. Stockman and Dott record experiments tending to show that morphine does paralyze more or less completely the nerve-endings, but only when large amounts come in contact with them. In the case of the sensory nerves the action is much the same. In man, tetanic symptoms are very exceptional, for, after therapeutic doses, the amount of morphine reaching the peripheral nerves is not usually sufficient to affect them. In infants and young children, however, convulsions not uncommonly occur as a result of poisoning by opium. Viewing morphine ($C_{17}H_{19}NO_3$) as a compound containing two hydroxyl groups, the hydrogen of one or both of these groups may be substituted by more or less complex radicles, forming derived bodies, which, being tested, produce positive physiological results, more or less approaching those of morphine. From these researches they conclude that chemical changes, restricted to what may be called the outlying groups of the molecules cause very little change in the physiological action, but where a change is made in the kernel or groundwork of the molecule the action is much more profoundly altered. In codeine or methyl-morphine, they found that the narcotic action was much diminished by the substitution of the alkyl radicle for the hydrogen atom, whilst the tetanic action and the action on the motor nerves were increased. The paralyzing effect on the motor nerve-endings was also more decided. Codeine is anodyne and hypnotic, and causes less general disturbance than accompanies the action of morphine. The generative functions are depressed by opium, and in chronic poisoning the menses cease and men become impotent while under its influence. The secretion of urine is lessened, but the bladder is often rendered irritable and urine is passed frequently in small quantities. On the other hand, partial paralysis, with retention, may occur. This drug increases the amount of urea and phosphoric acid eliminated.

The hypnotic action of opium is due partly to the lessened activity of the cerebral cells and partly to a reduction of the blood-supply to the brain-centres. It is therefore a *cerebral* depressant. Small doses,

however, 1 grain or less, temporarily arrest all the secretions except that of the skin, and stimulate the circulation; the heart's action is increased, arterial tension raised, and the pupils contract and do not respond well to light. Slightly quickened at first, the action of the heart soon becomes more slow and forcible. Immoderate doses may cause rapid and feeble action. These effects are attributable to exaltation or depression of the function of the pneumogastric nerve.

With this, in some persons, there is exhilaration and increased cerebration, with a sense of calm and indisposition to sleep until the effect passes away, when sleep occurs, from which the subject wakens with a headache, disordered stomach, and constipated bowels. In others, cerebral activity does not occur, but the spinal functions are exalted and restlessness occurs, with some irritation of the skin, or even an erythematous eruption. At times a general rash, resembling that of scarlet fever, is witnessed, and this eruption may be succeeded by desquamation. In other cases an urticarial efflorescence may appear. Itching of the skin is a very common result of a dose of opium. This substance exerts little or no local action. Its active principles, however, are quite readily absorbed through the unbroken skin.

Morphine, hypodermatically injected, is less apt to affect the appetite and bowels than opium given by the mouth. If, however, the solution should be thrown directly into a vein, temporary dyspnœa and clonic spasm may be produced. Larger doses arrest digestion and may cause vomiting with diaphoresis. The heart and circulation are depressed; the bodily temperature is reduced. A stuporous sleep is produced, with irregular and slow respiration, cool, clammy skin, and pin-point contracted pupils. In other cases coma-vigil and delirium may occur. Infants are extremely susceptible to the influence of opium. The drug should be administered to them in small doses, and its effects carefully watched. Aged people, also, bear it less well than those in the prime of life. Women are more amenable to the drug than men, and require smaller doses. The action of codeine resembles that of morphine, but is less decided. It is not so apt to derange the stomach or produce constipation. Codeine is not so potent an anodyne or hypnotic as morphine. Excessive doses have caused alarming prostration and distressing pruritus. A tolerance of opium is soon established, and, in those to whom it is constantly given, the dose must, from time to time, be increased in order to produce the desired results. **Protopine,** according to the experiments of Engel,* produces in mammals an action similar to camphor, death following its use by a paralysis of the respiratory centre.

Poisonous Effects.—If a fatal dose has been taken, the above symptoms

* Gazette Médicale de Paris, October 11, 1890.

intensify, the pulse becomes slower, respiration is reduced to five or six to the minute, the reflexes become abolished, and death occurs from paralysis of the respiratory centre, or carbonic-acid accumulation in the blood. Post-mortem examination may show some of the drug yet remaining in the stomach or intestines, and the internal organs reveal considerable venous congestion, especially the lungs. Laudanum is the agent most frequently taken with suicidal intent, and its presence may often be detected simply by the odor of the contents of the stomach.

Diagnosis of Opium Poisoning.—Opium poisoning may be mistaken for cerebral apoplexy or alcoholic intoxication, but attention to a few points of diagnosis will prevent error. The history may, or may not, assist in deciding the question. In **apoplexy** there is no contraction of the pupils (except in one case which will be mentioned presently), the eyes are deviated to one side, the sides of the face may not be symmetrical, and there is also paralysis of one or both limbs. The symptoms come on suddenly, often on rising in the morning; there is generally no history of taking any poison or food immediately before the attack; the face is congested or pale, not swollen and cyanosed as in opium-poisoning. In hæmorrhage into the pons Varolii, there is contraction of the pupils, but, as such cases are rare and generally fatal, the mistake will not be often made; moreover, the attack is sudden and the entire body is relaxed with involuntary evacuations of the contents of the bowels or bladder, which does not occur in opium poisoning. In **alcoholic intoxication** the patient can be roused and will answer questions; the pupils may be contracted, but will dilate when the patient is disturbed, or his beard is pulled; the odor of alcohol may assist in the diagnosis. It is possible, however, for the patient to swallow laudanum at the close of a drinking bout, and thus have both forms of intoxication. Uræmic coma might possibly be mistaken for opium poisoning, but in the former condition œdema is generally present, and the urine contains albumin and casts.

Treatment of Poisoning.—The stomach should be promptly evacuated with sulphate of zinc or ipecacuanha, or by using the stomach-pump. Emetics must be given in large doses on account of the insensitive condition of the stomach. A tablespoonful of mustard or alum in water acts as an efficient emetic, or apomorphine may be given hypodermatically. Tannic acid may be given as a chemical antidote. A pint or two of warm (not boiling-hot) coffee should be injected into the stomach and rectum. Artificial respiration should be practiced both by Sylvester's method and by the application of the faradic current, one pole to the cervical region and one over the ensiform cartilage. No attempt should be made to directly faradize the phrenic nerve, on account of the danger

of paralyzing the heart. The circulation should be maintained by massage, rubbing the blood up toward the body from the extremities, and, if the blood is heavily carbonized, venesection of 12 to 16 ounces may be performed with advantage. The surface of the body may be stimulated by the faradic brush, or by whipping with the fringed ends of towels or with twigs. The patient should be made to walk about supported by two assistants, as soon as he is restored to consciousness, and kept walking for six or eight hours, or until the influence of the opium has entirely passed off. Nevertheless, this exercise should not be too long continued on account of its exhausting effect upon the muscular system and heart. The capital point in the treatment is maintenance of respiration. If the measures instituted are found to gradually increase the number of respi rations per minute, the coma, in itself considered, need not be feared. The catheter should be used from time to time in order to encourage excretion by the kidneys. The patient should not be exposed too much to cold, on account of his lowered temperature and the danger of pulmonary congestion. The physiological antagonists—atropine, caffeine, or strychnine*—may be used cautiously, but only in physiological doses. Atropine may be injected hypodermatically in doses of gr. $\frac{1}{120}$–$\frac{1}{100}$ if the respirations become very slow, but the state of the pupil is no guide to the effect of the antidote. Strychnine can be administered subcutaneously in from $\frac{1}{100}$ to $\frac{1}{20}$ grain every hour or two until an improvement in the respiration takes place. Ammonia inhalations are useful, and when properly used are harmless. Opium poisoning produces no characteristic lesion. By reason of idiosyncrasy alarming results have followed the administration of small medicinal doses.

Treatment of Opium Addiction.—The treatment of chronic morphine poisoning, or opium-eating, is more moral than medical. In such cases the will of the unfortunate victim is so weakened by self-indulgence that the acquired taste for the drug cannot ordinarily be resisted, and he will acquire means for its gratification at any cost, or, if it is not obtainable, he may destroy himself. In such cases the medical attendant, before undertaking the treatment, must thoroughly gain the confidence of the patient; he should try to establish an understanding, and, if possible, sympathy, with him. He should make sure that the patient really wishes to escape from the terrible thraldom of the drug, and will co-operate with his physician. The patient should be put upon his honor, and pledge himself to obey orders and confine himself to the quantity permitted by his physician and to medicines passing through his hands. The daily amount must

*See papers, "Strychnine in Poisoning from Narcotics," by Dr. G. A. Gibson, in Practice, December, 1888; "Some of the Uses of Nux Vomica and Strychnine," by Dr. Frank R. Fry, in Weekly Medical Review, February 23, 1889; "Strychnine in Opium Poisoning," by Dr. Clara T. Dercum, in University Medical Magazine, January, 1891.

first be accurately determined, and an effort made at once to reduce this one-half, afterward diminishing day by day, supplementing the treatment by valerianate of ammonia, fluid extract of coca, or camellia, with tonics, easily-digested food frequently given, and some alcohol, in the form of an elixir preferably. It is advantageous to change the form of the drug: if the patient has been taking laudanum or other opiate, give morphine instead; if he has been taking sulphate of morphine, change it to the valerianate or some other salt. A change of scene is often beneficial. Dr. Waugh recommends a paste of coca-leaves and aromatics (Coca-bola, page 615) and the galvanic current in treating such cases. Dr. Woodbury prefers the gelatin-coated valerianate of morphine pills, owing to their convenience, and because other pills can be gradually substituted without the patient's knowledge. Massage is a useful adjunct to the treatment. Cottel (*American Practitioner and News*) recommends the following prescription for morphinism:—

℞ Morph. sulph. or tr. opii, ... q. s.
Ext. viburni prunifol. fl., ... f℥ss.
Elixir. ammoniæ valerianat., ... f℥iij.
Elixir. sodii bromidi (gr. v to the fʒ), ... q. s. f℥vj.
M. Sig.: Teaspoonful when required.

This is a mixture from which one is readily weaned when the opiate is withdrawn.

Therapy.—Powdered opium may be mixed into a paste with water and applied to an incipient boil with relief. Laudanum with water is a useful application to sprains and bruises; and it may be added to poultices to form an anodyne fomentation. Laudanum may be applied to wounds as an antiseptic and to relieve pain; and after heating in a spoon, to drive off the alcohol, it is a domestic remedy for earache, but the auditory canal should, in a few moments, be washed out with hot water. If there is a perforation of the ear-drum, a child might be narcotized in this way, by the drug passing down the Eustachian tube into the throat. Many anodyne liniments contain opium, and when these are applied with friction the remedy is partly absorbed. Such applications assuage the pain of chronic or muscular rheumatism, and even, at times, of sciatica. A warm lotion containing opium affords relief in synovitis and orchitis. Laudanum is usually a serviceable topical remedy in painful ulcers.

Opium may be combined and used thus locally:—

℞ Tinct. opii, ... f℥j.
Chloroformi,
Tinct. aconiti, ... āā f℥ss.
Ol. menth. pip., ... fʒj.
Lin. saponis, ... f℥ij.
M. Sig.: Apply well over the surface for neuralgia or rheumatism.

℞ Tinct. opii,
Aquæ hamamelidis dest.,
Aquæ camphoræ, ... āā f℥ij.
M. For an application to acute gout or rheumatism.

℞ Tinct. opii,
Spiritus vini rectificati,
Aquæ hamamelidis, ... āā f℥ij.
M. Serviceable in synovitis, felons, or orchitis.

℞ Tinct. opii,
Ext. arnicæ fl.,
Lin. saponis, ... āā f℥j.
M. For enlarged glands and thickened states of the skin.

℞ Extracti opii,
Extracti arnicæ,
Extracti belladonnæ alc., ... āā ʒj.
Ungt. hydrargyri oleatis (10 per cent.), ... ℥j.
M. For arthritis.

℞ Extracti opii, ... ʒss.
Cocainæ hydrochloratis, ... gr. x.
Mentholi, ... gr. xv.
Ungt. zinci oxidi, ... ℥j.
M. Beneficial in anal fissure, rectal eczema and in hæmorrhoids.

The inhalation of steam impregnated with paregoric, or the watery extract of opium, is beneficial in acute pharyngitis. Ringer recommends the topical application of morphine dissolved in honey or glycerin, in order to relieve the throat-cough of phthisis. This solution, or an opiated lozenge, is not without efficiency, even when the cough is entirely dependent upon the pulmonary condition. Gargles containing opium are often of benefit in the diseases named :—

℞ Tinct. opii camphoratæ,
Tinct. benzoini comp.,
Tinct. kino, ... āā f℥j.
M. Sig.: Employ, diluted with water, as a gargle.

℞ Tinct. opii camphoratæ,
Aquæ menth. pip.,
Glycerini, ... āā f℥j.
M. Sig.: Use as a gargle.

The oleate of morphine, with lanolin and a little chloroform, is a sedative application, or we may dissolve morphine in chloral-camphor and apply it over the site of pain. In various inflammatory conditions of the skin or conjunctivæ, fomentations with the recent decoction of poppy-heads is a soothing treatment, but is less anodyne and astringent than laudanum and hot water. Opium, morphine, or codeine may be introduced into the rectum in the form of suppositories, each containing

1 grain of the crude drug, or ½ grain of the extract, or of morphine or codeine, in painful conditions of the bowel and neighboring organs, and also, for its general effects, in producing sleep and quieting cough or restlessness. A warm bath and an opium suppository are of material value in relaxing the spasm which accompanies organic stricture of the urethra. These measures will frequently permit the escape of enough urine to cause considerable temporary relief in retention and, at the same time, facilitate the passage of a filiform bougie and catheter. An opium suppository often averts the chill which may follow instrumentation of the male urethra, quiets the nervous system after operations upon the female pelvis, and relieves the pain and tenesmus of cystitis and strangury.

Dr. von Klein, of Dayton, advocates the administration, in certain cases, of morphine by the nostrils. He states that, snuffed into the nose, this alkaloid is active in smaller doses than when given by the mouth, and that it is readily absorbed.

Hypodermatic Administration.—Morphine is frequently injected hypodermatically in order to produce its physiological effects, and the rule is to begin with a dose, at the most, only half as large as would be given by the mouth. Atropine is frequently combined with the morphine, and administered in this way to enhance its effect in treating neuralgia; they are also used in this combination (gr. ¼ and gr. 1/120) previous to the use of chloroform, especially when a prolonged operation is anticipated. In cases of local pain, as first pointed out by Dr. Alexander Wood, of Edinburgh, who introduced the hypodermatic method, there is an advantage in making the injection close to the spot affected, although, for a general anodyne or hypnotic effect, the skin on the arm or dorsum of forearm is generally selected. The rules for hypodermatic medication may be briefly stated as follows:—

1. The instrument must be surgically clean and aseptic.

2. The solution used should be made with recently-boiled distilled water, or at least with recently-boiled water.

3. The patient should not be allowed to prescribe the injection, but it should be used only when, in the judgment of the physician, it is appropriate, necessary, and justifiable.

4. The spot selected should be cleansed, and the needle pushed through a fold of the skin pinched up with the fingers of the other hand to that holding the instrument, being careful, in introducing it, to avoid proximity of veins. The desired amount being gradually injected into the loose cellular or muscular tissue, the needle is withdrawn, while with the finger pressure is made over the slight puncture and the fluid is gently dispersed under the skin.

It should be remembered that the morphine enters the circulation

more quickly than when absorbed from the alimentary canal, and once injected cannot be withdrawn. In a strange patient, where idiosyncrasies are unknown, it would be wise to give not more than gr. $\frac{1}{10}$ to $\frac{1}{8}$, and watch the effects, repeating and increasing the dose if required. On account of the extreme susceptibility of young children to opium, the hypodermatic method is considered inadvisable for them; and in elderly persons, or patients suffering with Bright's disease of the kidneys, it is used only with extreme caution.

Special Applications.—Opium is used symptomatically to relieve pain and irritation, to relax spasm, to produce sleep, to check secretions, and to influence nutrition. The preparations of opium and its salts are so efficient and convenient in the treatment of all forms of pain that the habit of indulgence is readily formed. It is therefore prudent for the physician not to inform the patient of what he is using, or to always give it in combination with other drugs. In some forms of brain disease, attended by congestion of the hemispheres, opium is inadmissible, especially in the form accompanying alcoholism. Meningitis, however, is benefited by opium, and in the cerebro-spinal form the deodorized tincture should be given in doses large enough to keep the patient from suffering. In biliary, renal, or intestinal colic, morphine, given by the mouth or hypodermatically, is the most common means of relief; also in angina pectoris, palpitation of the heart, or cardiac dyspnœa.

Small doses of opium—5 drops of the tincture, for instance—have an excellent stimulant effect in the case of a weak or dilated heart. In paroxysmal cardiac dyspnœa, as contradistinguished from asthma and that due to pleural effusion, the hypodermatic injection of morphine is followed by wonderfully good results, as pointed out by Allbut and confirmed by Ringer. Respiration becomes comparatively free, lividity disappears, and sleep is rendered possible. At first, $\frac{1}{6}$ grain twice or thrice a week is sufficient; subsequently it may be necessary to gradually increase the dose. This treatment more particularly applies to mitral than to aortic disease.

In bronchial and pulmonary affections, irritation of the sensory end-organs often excites cough, which is in excess of what is demanded for the expulsion of the inflammatory products from the air-passages. Moderate doses of morphine or opium, added to an expectorant mixture, restrain the cough of irritative origin, the irritation accompanying bronchitis being relieved by opium, and cough overcome so as to permit sleep; the secretions are also checked by it, so that it is a useful remedy especially in the declining stages of bronchitis, but a dangerous one in the early or congestive stage, where even a small dose may be fatal.

In bronchial asthma, opium alone or combined thus has a most

decided action in giving relief and in assisting to check the morbid process :—

℞ Tinct. opii,
Tinct. lobeliæ, ... āā f ʒj.
Ammonii iodidi, ... ʒij.
Extracti grindeliæ robust. fl., ... f ℥ss.
Glycerini, ... q. s. ad f ℥iv.
M. Sig.: A teaspoonful three or four times a day or at any time during a paroxysm.

In pneumonia, opium is of advantage in relieving pain and excessive cough; here it is best given in the form of Dover's powder or in the following combination :—

℞ Antimonii et potassii tart., ... gr. j.
Pulv. ipecac et opii, ... gr. xl.
Potassii nitratis, ... ʒj.
M. Div. in chartæ no. xx.
Sig.: Take one every two hours, in pneumonia.

In pneumonia and pleurisy, when the pain is severe, opium may also be prescribed as follows :—

℞ Pulveris opii, ... gr. iv.
Hydrarg. chloridi mitis, ... gr. j.
Pulveris aromatici, ... gr. xij.
M. et ft. chartæ no. xij.
Sig.: A powder every half-hour or hour until relieved.

℞ Pulveris ipecac et opii,
Camphoræ monobromatæ, ... āā ʒss.
M. et ft. capsulæ no. x.
Sig.: A capsule every half-hour or hour.

In typhus and typhoid fevers, small-pox, and other acute fevers, attended by poisoned blood and great delirium and restlessness, opium in appropriate doses at night will often be of great service in maintaining the strength of the patient. The above combination of tartar emetic and opium is extremely efficacious in those cases of typhus and typhoid fever characterized by furious delirium, insomnia, and exhaustion. In various other conditions the beneficial effects of opium are apparent. For instance, in rupture of the uterus, bladder, or intestines, in peritonitis, the only chance of recovery consists in keeping the patient fully under the sedative influence of opium, using the deodorized tincture in preference to any other form. In after-pains, in threatened abortion, in some cases of dysmenorrhœa, the judicious use of an opiate will afford immunity from suffering.

A hypodermatic injection of morphine is of much service in ovaralgia, as in other forms of neuralgia. Another statement may be made here in regard to the efficacy of this mode of treatment in neuralgia

generally, viz., not only is the attack temporarily relieved, but not infrequently the disorder is cured, or, at least, remains in abeyance for a considerable period. Cancer of the womb, or, indeed, malignant disease wherever seated, demands, almost without exception, the administration of some form or preparation of opium. Here, and, in fact, as in all essentially painful diseases, the remedy should be given with judicious boldness. Excessive pain requires full doses; smaller fail to relieve pain, increase nervous excitement, and are prejudicial rather than beneficial. In the treatment of cancer, there need be little or no fear of founding the morphine habit. Opium is useful in acute suppression of the menses when owing to moral or emotional excitement. Severe and deep burns are always marked by profound shock and excruciating pain, and in these conditions the hypodermatic use of morphine is invaluable. Herpes zoster is another malady in which morphine, especially in union with atropine, is of notable service in relieving the violent, lancinating pain.

In cough mixtures, opium or morphine is a standard ingredient, but codeine has advantages when the cough is spasmodic and violent:—

℞ Codeinæ,		gr. iij.
Tinct. belladonnæ,		f3j.
Syr. pruni Virginianæ,	q. s. ad	f℥iij.

M. Sig.: Take a teaspoonful, when cough is annoying, four or five times daily.

In phthisis, the above formula will be useful in checking the cough at night and reducing tendency to night-sweats.

Opium is very serviceable in treating diabetes mellitus, and is preferable to codeine, which is also recommended for this purpose. Opium is, perhaps, the most efficient drug which we possess in the treatment of this disorder. It diminishes hunger and thirst, the quantity of urine excreted, and the amount of sugar eliminated. The progress of the disease is checked and the condition of the patient ameliorated. Large doses are required and well-borne in diabetes mellitus. The proper plan is to begin with moderate doses, and rapidly, but watchfully, increase according to the effect of the remedy upon the glycosuria, or until symptoms of narcotism make their appearance. Opium is also of service in diabetes insipidus, though less active than in saccharine diabetes.

In treating chronic ulcer, the administration of small amounts of opium several times daily will bring about a healthy condition and encourage healing. Given in larger quantities, 1 or 2 grains every three or four hours, opium is of equal value in the treatment of phagedæna, alleviating pain and checking the tendency to spread. This drug is beneficial in ulcerative stomatitis. Where there are excessive secretions opium will reduce them, as in bronchorrhœa, diarrhœa, dysentery, etc. In the diarrhœa of typhoid fever, opium may be judiciously and use-

fully employed, and it is often successful in controlling tuberculous diarrhœa. In various formulæ for cholera, opium holds a prominent place. In infants suffering with summer complaint, enterocolitis, or cholera infantum, all forms of narcotics are so dangerous as to be almost prohibited. The object of treatment is evacuation and disinfection of the intestinal tube, with administration of sterilized food; where this has been done, opium will generally not be required. In selected cases, however, it may be given in starch-water enemata (a drop or two of laudanum with 5 grains of chloral hydrate), in order to afford relief from restlessness and pain.

In the diseases previously referred to, opium is often so necessary in the treatment that we may append a few prescriptions containing this very important drug:—

℞ Pulveris opii, ... gr. ss.
Pepsini sacch.,
Bismuth. subnit., ... āā ʒss.
Ol. cinnamomi, ... ♏j.

M. et ft. chartæ no. x.
Sig.: A powder every two or three hours for diarrhœa in children.

℞ Extracti opii, ... gr. viij.
Pulv. ipecacuanhæ, ... gr. xxiv.
Hydrargyri chloridi mitis, ... gr. xvj.

M. et ft. pil. no. xvj.
Sig.: A pill every hour or two for diarrhœa or dysentery in adults.

℞ Tinct. opii camphoratæ,
Tinct. cardamom. comp.,
Tinct. lavandulæ co., ... āā f℥j.
Aquæ menth. pip., ... f℥iij.
M. Sig.: One tablespoonful every two or three hours for cramps and diarrhœa.

℞ Tinct. opii, ... fʒss.
Syrup. rhei aromatic., ... fʒij.
Tinct. cardamom. comp., ... f℥j.
Aquæ anisi, ... q. s. ad ℥v.

M. Sig.: From one to two teaspoonfuls every two or three hours for diarrhœa of children.

℞ Tinct. opii,
Spiritus menth. pip.,
Spiritus camphoræ,
Tinct. capsici, ... āā fʒj.
M. Sig.: Ten to forty drops every hour or two for diarrhœa with cramps.

℞ Tinct. opii,
Spiritus chloroformi,
Tinct. capsici,
Spiritus ammoniæ aromat., ... āā fʒj.

M. Sig.: Twenty to forty drops every half-hour or hour for cramps attended with diarrhœa.

℞ Tinct. opii camphoratæ,
Mist. cretæ,
Tinct. kino, ... āā f℥ij.

M. Sig.: From a half a teaspoonful to a tablespoonful every hour or two for diarrhœa.

Nausea and nervous vomiting are generally alleviated by the administration of opium. This remedy is useful in seasickness and the vomiting of pregnancy, in each of which it is apt to be more efficient if given subcutaneously. The same method is of value in obstinate hiccough. The pains of gastralgia, ulcer, and gastric carcinoma are amenable to the influence of opium, which is, furthermore, useful in ulcer in restraining hæmorrhage. There is a form of dyspepsia in which opium is of signal service. This is of an irritative character, occurs in thin people of an irritable, anxious temperament, and is indicated by a dry tongue, red at the tip and edges. Lead colic is lessened by opium. In acute obstruction of the bowels, due to spasm, $\frac{1}{2}$ grain of opium every four hours, for two or three days, will often relieve stercoraceous vomiting and permit normal evacuations. Even in fæcal impaction, good results have ensued from the daily injection of $\frac{1}{2}$ to 1 grain of morphine. This treatment is especially adapted to instances in which the gut has been injured by congestion or inflammation.* In chronic constipation, opium alone or combined with ipecacuanha often relieves the irritable bowel and assists in restoring tone and a healthy action to the mucous membrane. In gastritis, especially the acute variety produced by alcoholism, opium relieves pain and vomiting. The nervous manifestations of exophthalmic goitre sometimes receive benefit from opium.

The antispasmodic influence of this drug has been utilized in various convulsive affections. It is of undoubted service in severe cases of chorea in which twitchings abolish sleep, and it was given by Trousseau in large doses with good effects. The *petit mal* and nocturnal epilepsy are benefited by opium. Scanzoni and Loomis have amply demonstrated the safety and the value of hypodermatic injections of morphine in uræmic coma. Although inefficiency of the eliminative organs ordinarily furnishes a contra-indication to the use of this remedy, yet in this alarming accident the morphine promotes the action of the skin and seems to exert a protective influence upon the nerve-centres. In tetanus, the deep injection of morphine into the affected muscles seems to be of some service. A hypodermatic injection of morphine will frequently break up a spasm of asthma. Opium is of advantage in emphysema, hay fever, and the spasmodic stage of whooping-cough. Ten grains of Dover's powder alone, or, preferably, combined with an equal quantity of quinine

* Phillips, op. cit., p. 168.

sulphate, will abort a cold if given in its incipient stage. Morphine is a reliable stimulant in surgical shock and heat exhaustion; in both cases it should be administered hypodermatically. In acute and chronic mania, and in melancholia, opium is capable, in selected cases, of affording decided benefit, especially in melancholia. Its administration in cases of alienation needs, however, to be directed with enlightened judgment. Dover's powder, in 10-grain doses, is often successful in checking the night-sweats of phthisis. The hypodermatic injection of a small dose of morphine is of avail in hæmoptysis.

Apomorphine.—As the result of a series of clinical experiments, Murrell* has ascertained that apomorphine, given by the mouth, is tolerated in much larger doses than had been supposed. He was able to administer 1, 1½, or even 2 grains, thrice daily without exciting nausea. In these quantities he found apomorphine hydrochlorate an excellent expectorant in chronic bronchitis, bronchorrhœa, and emphysema. Murrell usually prescribes the apomorphine in syrup of wild cherry, syrup of tar or of lemon. The addition of a few drops of nitro-hydrochloric acid to the mixture is advantageous. The same observer has employed apomorphine as a spray with very satisfactory results. He has frequently given as much as ½ drachm of a 1-per-cent. solution in a little water for each inhalation. A combination of apomorphine and morphine is valuable, and has been employed by Rossbach in phthisis. The cough becomes less frequent and the sputum more fluid.

Apocodeine.—The properties of apocodeine are similar to but weaker than those of apomorphine. Dujardin-Beaumetz states that it has been found useful in hæmoptysis, croup, and whooping-cough, and recommends it in doses of ¼ grain hypodermatically and ⅜ grain by the mouth. Dr. Murrell has demonstrated that apocodeine hydrochlorate is beneficial in chronic bronchitis by virtue of its expectorant properties. He administered it by hypodermatic injection, which produces no local irritation, provided the solution be neutral.

Idiosyncrasy, Cautions as to Use of Opium, etc.—Some persons are extremely susceptible to even minute doses of opium or morphine, being made very uncomfortable by it, and rendered wakeful and irritable, or annoyed by itching of the nose and eruptions upon the skin. When this fact has been ascertained some other narcotic must be selected, because opium would be worse than wasted upon such a case. The family physician is expected to keep such an idiosyncrasy in mind when prescribing, and cases of this kind are not rare, by any means.

* "On the Action of Apomorphine and Apocodeine, with Reference to their Value as Expectorants in the Treatment of Chronic Bronchitis," by William Murrell, M.D., F.R.C.P., in the Medical Bulletin for March, 1891.

Flagg states that when opium, or any of its ordinary preparations, fails to produce a good effect, a solution of bimeconate of morphine often acts well. This preparation, he adds, is an anodyne of decided efficacy where ordinary preparations of opium are idiosyncratically contra-indicated. The dose is from 5 to 25 drops, as required. When mothers are suckling their babes, opium should be given sparingly, if at all, because, being partly eliminated by the milk, it may narcotize the infant. As previously stated, infants are easily affected; and when children have coma or convulsions, *and the pupils are contracted*, the attendant may suspect that some one has administered an overdose of opiate to them.

The other alkaloids and constituents of opium are not used in medicine.

ORIGANUM (U. S. P.).—**Origanum, Wild Marjoram.**

Dose, ʒi–ij, in infusion or fluid extract.

Pharmacology.—The entire plant of Origanum vulgare (Labiatæ) is officinal; it is a small herb of Europe and the United States, with pale-purple flowers. It contains **volatile oil** (1 to 2 per cent.), with tannin, resin, and some bitter principle. It enters into aromatic wine. The oil is an aromatic stimulant, carminative, and counter-irritant.

Therapy.—Rarely used internally or externally; though formerly employed as a diaphoretic, emmenagogue, and stimulant tonic, or as a fomentation for bruises and sprains.

ORTHOSIPHON STAMINEUS.—**Java-Tea.**

Preparation.

Extractum Orthosiphon Fluidum.—Fluid Extract of Orthosiphon. *Dose,* ♏xx–xxx, largely diluted.

Pharmacology.—Orthosiphon stamineus (Labiatæ), or Java-tea, is a perennial plant from one to three feet in height, growing in India, the East Indian islands, Java, and Australia. It contains a glucoside, which has been named **Orthosiphonin.** The leaves are the portion employed.

Physiological Action and Therapy.—This plant possesses diuretic properties, and has been found beneficial in diseases of the urinary tract. It has been given with good effect in gravel, pyelonephritis, and chronic cystitis, and is said to be serviceable also in gout. Dr. Frochard has reported a case in which this drug reduced ascites due to cirrhosis of the liver.

OSMII PEROXIDUM.—**Peroxide of Osmium, Osmic Acid.**

Pharmacology.—Osmic acid is the tetroxide of osmium. It forms colorless, acicular crystals, which sublime even at ordinary temperatures, and are easily fusible to a colorless liquid, with irritating vapor resembling

chlorine, and capable of setting up inflammation of the eyes or of the air-passages.

Physiological Action.—In animals, osmic acid is actively poisonous in doses of only a few grains. A 1-per-cent. solution in water, or water and glycerin, is injected subcutaneously in man in the treatment of painful tumors and superficial neuralgia. No reaction, as the rule, follows these punctures, but sanguineous cysts and boils have been reported. A painful eruption upon the skin sometimes results from the application.

Therapy.—In some cases of neuralgia, the injection of a few drops of the centesimal solution deeply into the neighborhood of the nerve affected affords prompt relief to pain. It has also been applied to the skin in treatment of chronic indurated acne and some tubercular syphilides. Administered internally in epilepsy, in doses of gr. $\frac{1}{6}$ daily in pill form, it failed to have any decided beneficial effect in the hands of Dr. Schroeder* (*Inaug. Thesis, Univ. of Kiel*).

PANCREATINUM.—Pancreatin.

Dose, gr. i–v.

Preparations.

Extractum Pancreatis.—Extract of Pancreas. *Dose,* gr. i–v.

Pulvis Pancreatini.—Powdered Pancreatin. *Dose,* gr. v–x (usually mixed with powdered malt).

Liquor Pancreaticus.—Solution of Pancreatin. *Dose,* f℥i–iv.

Pharmacology and Physiological Action.—Pancreatin is a digestive ferment obtained from the fresh pancreas, usually from the pig, resembling pepsin in origin, mode of preparation, physical characters, effects and therapeutic uses. Pancreatin contains an amylolytic ferment (similar to ptyalin or diastase); a proteolytic ferment (like pepsin, except that it is active in an alkaline medium) called **Trypsin**; a fat-emulsifier (like that found in bile); and a milk-curdling ferment (also present in calf-pepsin). The product may be obtained in the form of a powder for administration, like saccharated pepsin; but a better form would be in a recent solution made directly from the pancreas in dilute alcohol (the pancreas is minced or ground, thoroughly mixed and exhausted with water, strained, and dilute alcohol added to preserve it), this being known as liquor pancreaticus.

Pancreatin is an efficient digestive agent in an alkaline medium, thus differing from pepsin. It will peptonize milk, gruel, oysters, and many articles of food, thus rendering them more easily digested and more nourishing for the invalid. As it emulsifies fat, it will aid in the assimilation of codliver-oil and prevent its coming up in the throat. Trypsin will digest, and render soluble, mucous and fibrous deposits.

* Therapeutic Gazette, November 15, 1889, p. 766.

Therapy.—In diphtheria, a spray of trypsin, or of pancreatin solution, will dissolve the false membrane and favor its expulsion. In hæmorrhage into the bladder, with the formation of clots, the deposit may be dissolved in the same manner as by the use of pepsin. If pancreatin be administered two hours after meals, it will assist intestinal digestion. It should be preceded by full doses of sodium bicarbonate, to insure an alkaline condition of the gastric contents. The pancreatin may be prescribed as follows:—

℞ Pulveris pancreatini, ... ʒj.
Hydrargyri chloridi mitis, ... gr. ij.
M. et ft. chartæ no. xij.
Sig.: A powder two hours after meals.

℞ Liquor. pancreatici, ... f℥iij.
Tinct. nucis vomicæ, ... ♏c.
Glycerini, ... f℥ij.
M. Sig.: A tablespoonful after meals.

Pancreatin, or food predigested by its action, is available in cases of enfeebled digestion due to severe and prolonged illness and in wasting disease. It is frequently useful, moreover, in the vomiting of hysteria or pregnancy.

PAPAIN, or **PAPAYOTIN.—Papoid.**

Dose, gr. i–v.

Pharmacology.—Nearly ten years ago, Wurtz, of Paris, isolated from the milky juice of the pawpaw-tree, or Carica papaya (Passifloraceæ), a peculiar ferment, capable of rendering albuminous substances soluble. The attention of the profession was called to this new digestive agent by Dr. Finkler, of Bonn.* Papain is soluble in water, though not in alcohol, but is active in either an acid or alkaline solution, and is more energetic than pepsin in dissolving false membranes. Recently Woodbury has published an article† stating that Señor Marcano, of Bolivia, has found that a similar ferment, **Bromelin,** exists in pine-apple and other plants of the natural order Bromeliaceæ, and has applied it to the peptonizing of meat on a large scale, making a preparation of powdered beef, which is very easily digested and the proteid matter of which consists of 50 per cent. of peptones. It is known as the Mosquera-Julia Beef-Meal, for which Parke, Davis & Co. are the agents for the United States. The juice of the fig and many other plants possess slight digestive powers, as beautifully shown in the well-known Dionæa, or Venus's fly-trap, and other members of the Drosera family, which Darwin found to secrete an acid juice which would digest small pieces of meat.

* Papain-Finkler is sold in this country under the name of "Papoid." See article on "The Digestive Ferment of the Carica Papaya in Gastro-Intestinal Disorders," by Prof. Frank Woodbury, New York Medical Journal, July 30, 1892.

† "On the Use of Nitrogenized Food in Fever and Wasting Diseases," Therapeutic Gazette, December, 1890, p. 811.

Therapy.—Papain has been used to dissolve the false membranes in diphtheria and croup, by the spray and by a camel-hair brush dipped in aqueous solution (gr. xxx or ℨj–f℥j). Though it accomplishes this useful purpose, it has no power to prevent fresh formation of the membrane, and must, consequently, from time to time, be re-applied. An alkaline solution of papain has been found beneficial in fissures and ulcers of the tongue. A paint containing 50 grains of papain and 25 grains of borax to the ounce of water has been used with success in the treatment of warts and eczema squamosum chronica. Papain dissolves intestinal worms. It has also been injected into the interior of tumors to promote absorption.

In the various forms of dyspepsia, papain has been employed with good effect. Grineritshi recommends papain (*Bull. Gén. de Thérap.*) in habitual indigestion attended with acid eructations, painful symptoms of gastric fermentation, and constipation. He uses 2 grains of this drug in sugar of milk an hour or two after taking food. The following combination is suggested :—

℞ Papaini,	ℨss.
Liquor. ammonii acetatis,	f℥ij.
Creasoti,	♏v.
Glycerini,	f℥ij.

M. Sig.: Two teaspoonfuls an hour or two after taking food.

Papain has not been much used as a substitute for pepsin or pancreatin on account of its much higher cost, but it is probable that this may be overcome in time, and that a pure vegetable digestive agent of superior activity to pepsin, and possessing the advantage of being efficient in an alkaline as well as an acid medium, may be supplied at a reasonably low price.

PARALDEHYDE.—Paraldehyde.

Dose, ♏xx–fℨij.

Pharmacology.—Paraldehyde, chemically, is a polymeric modification of aldehyde, formed by the action of a trace of sulphuric acid, or of zinc chloride, on aldehyde. It is a colorless, mobile liquid, dissolving in eight volumes of cold water, is less soluble in hot water, but dissolves freely in alcohol and ether. Paraldehyde crystallizes below 50° F. and boils at about 225° F. It has a burning, unpleasant taste and a penetrating, ether-like odor. It may be given with syrup and a vegetable bitter, or with an ounce of aromatic water.

Physiological Action.—A hypnotic agent, exercising no depressing effect upon the heart in ordinary doses and causing no headache or disturbance of digestion. Paraldehyde is a good substitute for chloral, especially in low fevers or where the heart is weak. It is also diuretic, but not dia-

phoretic. The solid constituents of the urine, it is said, are not increased, though, in the case of three boys to whom paraldehyde was experimentally administered, Gordon found a marked increase of urea. This substance is possessed of antiseptic properties. Death, preceded by unconsciousness and coma, has been caused by a dose of 6 or 7 drachms in a patient suffering with typhoid fever (*Lancet*, August 20, 1890). The fatal result from a toxic dose is attributed to its action upon the respiratory centre. In some cases, it has been accused of producing albuminuria, but this might be explained by the presence of cirrhotic kidneys, with transitory attacks of albuminuria. Paraldehyde is very rapidly absorbed, and is eliminated by the lungs, its odor having been recognized in the breath twenty-four hours after administration. Paraldehyde is a physiological antidote to strychnine.

Therapy.—Bright's disease does not prohibit the use of paraldehyde. In such cases, where insomnia is persistent, the dose should be ♏xxx–xl to commence with, given at the bed-hour, and cautiously increased to a drachm if necessary. In the irritability, restlessness, and insomnia attending heart disease, 20 drops may be given every four hours, with large doses at night, with marked benefit. In bronchitis, pneumonia, and headache, paraldehyde is generally less useful than chloral hydrate and bromide, but in phthisis with persistent insomnia, in 40-minim doses at bed-time, it produces a natural sleep lasting twelve hours. Some patients, however, complain of headache next day and persistent drowsiness, so that it soon has to be discontinued. Paraldehyde is, perhaps, particularly applicable to wakefulness associated with psychical disturbances. Very favorable accounts have been given by various observers of its beneficial influence in the cerebral manifestations of hysteria, in mania, melancholia, and in the general paralysis of the insane. Paraldehyde is the preferred hypnotic* in the neurological clinic at Dorpat. It seldom fails to produce a good night's sleep; though, in some instances, tolerance is soon established. It may give rise to indigestion and diarrhœa, but its use is not followed by headache and depression. It has been used with advantage in delirium tremens, morphinism, and epilepsy. Paraldehyde, in order to disguise its unpleasant taste, may be administered as follows:—

℞ Paraldehydis,		f℥ss.
Olei gaultheriæ,		♏x vel xx.
Pulveris acaciæ,		ʒij.
Syrupi pruni Virginianæ,	q. s. ad	f℥iv.

M. et ft. emulsio.

Sig. A half to a tablespoonful in water every hour or two. Use as a hypnotic, or to lessen bronchial or pulmonary irritation.

* "The Hypnotic Efficiency of Paraldehyde," New York Medical Journal, November 29, 1890.

With the combined administration of caffeine (4 to 8 grains daily) and paraldehyde (30 to 45 drops at night), Cevello found, in cases of œdema, ascites, and pleuritic effusion, that the amount of urine was greatly increased.

PAREIRA (U. S. P.).—**Pareira, Pareira Brava.**

Dose, ʒss–j, in infusion (1–17) or fluid extract.

Preparation.

Extractum Pareiræ Fluidum (U. S. P.).—Fluid Extract of Pareira. *Dose*, fʒss–j.

Pharmacology.—The root of Chondodendron tomentosum (Menispermaceæ) is officinal as Pareira; products of allied genera also appear in commerce under the name of "false Pareiras." It is a climbing, woody vine of Brazil, where it is extensively used as a medicine. Pareira contains **Buxine,** a bitter, somewhat tonic alkaloid; found also in false pareiras and other plants occasionally employed in medicine. Buxine is identical with the beberine of Nectandra, and is the active principle of box-wood; it has also been known as "pelosine," or "cissampeline."

Physiological Action.—Pareira is slightly tonic, but is esteemed principally as a diuretic and laxative, though, probably, without much reason.

Therapy.—It is principally used in fluid extract, decoction, or infusion, with alkalies, in the treatment of irritable bladder, cystitis, pyelitis, chronic urethritis, and leucorrhœa. In South America it is given for snake-bite, and applied externally to the wound.

PEPO (U. S. P.).—**Pumpkin-Seed.**

Dose, ʒi–ij.

Pharmacology.—The seeds of Cucurbita pepo (Cucurbitaceæ), or pumpkin, contain a resin, an alkaloid, **Cucurbitine,** oil, starch, sugar, etc. The seeds are crushed and beaten into a paste with milk and white sugar, and the resulting emulsion strained; or the seeds may be decorticated first and the contents rubbed up with sugar and milk, or sugar and water.

Therapy.—The principal medicinal use of pepo is for destroying tape-worms. It is generally efficient, cheap, and not very difficult to take. A preliminary purge of calomel should be given in the morning and the emulsion swallowed fasting at night. In the morning, a laxative (castor-oil, Rochelle salt, etc.) is administered, and the tape-worm is discharged, with the head. It is said that the resin (in doses of gr. xv) or the fixed oil (in doses of f℥ss) are also efficient when administered in the same manner. The combination of oleoresin of aspidium (or male fern) is very serviceable in destroying the tape-worm :—

℞ Oleoresinæ aspidii, ... f℈j.
Chloroformi, ... ♏x.
Emulsion. peponis, ... f℥xij.

M. Sig.: To be divided into two doses, to be taken one hour apart, and followed by castor-oil an hour later.

PEPSINUM SACCHARATUM (U. S. P.).—**Saccharated Pepsin. Dose**, gr. x.

Preparations.

Liquor Pepsini (U. S. P.).—Solution of Pepsin (saccharated pepsin 40, hydrochloric acid 12, glycerin 400, water q. s. ad 1000 parts). *Dose*, f℥ss.

Pepsinum Purum in Lamellis.—Pepsin in Scales, Pure Pepsin. *Dose*, gr. i–ij.

Vinum Pepsini.—Wine of Pepsin. *Dose*, f℈i–ij.

Glycerol Pepsini.—Glycerol of Pepsin. *Dose*, ♏x–xxx.

Vinum Pepsini Seriparum.—Rennet-Wine. *Dose*, f℈j–℥j.

Glyceritum Pepsini Vitulini.—Glycerite of Calf-Pepsin. *Dose*, f℈i–iv.

Pharmacology.—Of the numerous methods proposed for obtaining for medicinal use the digestive ferment from the gastric mucous membrane of certain domestic animals (hog, calf, sheep, principally) the most prominent are (1) scraping the acid mucous secretion from the surface of the stomach, spreading on glass and drying in scales (Beale); (2) extracting by maceration in acidulated water and precipitation with alcohol or lead acetate, and (3) by precipitation with sodium chloride. (Scheffer.) The digestive preparations of the United States Pharmacopœia are based upon the results of Professor Scheffer's experiments; they are one solid and one liquid. **Saccharated pepsin** is pepsin obtained from the gastric mucous membrane of the hog, mixed with sugar of milk. It is a white powder, of a peculiar but not disagreeable odor and taste, and a slightly acid reaction. One part dissolved in 500 parts of water, acidulated with 7½ parts of hydrochloric acid, should digest at least 50 parts of hard-boiled-egg albumin in five or six hours at a temperature of 38° to 40° C. (100° to 104° F.). **Liquor pepsini,** or solution of pepsin, is an acidulated solution of the preceding, containing glycerin (40 per cent.). It is an artificial gastric juice, with an agreeable, acidulous taste; it should not become moldy, nor acquire a fetid odor when kept for some time. Many kinds of pepsin are upon the market, varying greatly in purity and digestive activity. Those containing a considerable quantity of mucus, which have a strong odor of the pig-sty, and which do not prove to have digestive activity when tested with boiled egg-albumin, should be rejected. Under comparative tests made by Professor Chittenden not long ago, the *pepsinum purum in lamellis*, made by Parke, Davis & Co., was found to have the greatest digestive power and to be the purest in the market. The glycerole of pepsin, made by the same house, is also a very active preparation. The pepsin preparations of Messrs. Fairchild Bros. & Foster, of New York, are likewise

active and acceptable agents, and are very largely used. Pepsin requires an acid medium in order to exert its digestive power upon albumin, while trypsin, or pancreatin, is active in a neutral or alkaline solution. As already stated, papain or papayotin is also active in either acid or alkaline solutions. A preparation from the same plant (Carica papaya) is sold under the name of **Papoid,** and is claimed to have special utility in dissolving false membranes. (See **Pancreatinum,** page 793.)

Physiological Action.—Pepsin is a constituent of normal gastric juice, associated with hydrochloric acid. It is a complex, albuminous substance, capable of causing changes in other albuminoids by a process similar to fermentation, or catalysis, converting them into peptones or albumoses. It also converts blood-coagula, fibrin, etc., from the solid to the soluble or liquid state. It is an unorganized ferment, peculiar to gastric juice of the higher animals, although similar ferments have been discovered in carnivorous plants, and in the paw-paw, pine-apple, etc. Alcohol precipitates pepsin, and, even in dilute form, checks its activity. Alkalies and some mineral salts also precipitate it.

Therapy.—Pepsin, in concentrated solution, may be locally applied to digest blood-clots in the urinary bladder; and, in atomized solution or spray, to dissolve the false membrane in diphtheria and croup. In the former affection the diphtheritic membrane may be treated with this solvent, containing pepsin :—

℞ Pepsini puri (in lamellis), ... ʒij.
Acidi hydrochlorici dil., ... ♏x.
Aquæ menth. pip.,
Glycerini, ... āā f℥ss.
M. Sig.: Paint over the surface several times a day.

A 5-per-cent. solution of scale-pepsin, in lanolin, is a useful application to clean off old ulcers. In connective-tissue tumors of non-malignant character pepsin may be used by parenchymatous injection to promote absorption. Mr. John Clay has seen good results follow the application of pepsin to cancer of the cervix uteri. He states that much of the neoplastic tissue may be destroyed, and that in some instances an apparently sound surface is obtained. The chief use of pepsin is to aid weak digestion and it is invaluable in atonic dyspepsia, especially following acute diseases. While the stomach should not be expected to depend entirely upon outside sources for its gastric juice, yet, in conjunction with hygienic treatment, the temporary resort to pepsin is followed by the best results. Given in this manner pepsin acts, in fact, as a true stimulant to the gastric glands and promotes their functional energy. In chronic maladies, such as anæmia, chlorosis, diabetes, tuberculosis, and carcinoma, the administration of pepsin is of service by promoting nutrition. In

malnutrition, foods may be partly peptonized previous to administration, thus saving time in stomach digestion. The use of peptonizing tubes, each containing sufficient for a pint of milk, is of great assistance in preparing such food, especially in the case of infants. In irritable stomach, pepsin acts as a sedative, and may be given in conjunction with subnitrate of bismuth or minute doses of calomel:—

℞ Pepsini puri (in lamellis),
Bismuth. subnit., ... āā ʒj.
Olei cinnamomi, ... ♏xij.
M. et ft. capsulæ no. xij.
Sig.: A capsule after meals.

℞ Hydrarg. chlor. mitis, ... gr. j.
Pepsini saccharati, ... ʒj.
Pulv. myristicæ, ... gr. iv.
M. et ft. chart. no. xij.
Sig.: Take one every half-hour to relieve nausea and vomiting.

Pepsin is also useful in gastralgia, pyrosis, gastric catarrh, and apepsia of infants. In gastric cancer or simple ulcer, feeding may be carried on by the rectum, provided some pepsin be added to the nutritive enemata. But this remedy, when given by the mouth, is frequently of value in relieving the vomiting due to ulcer or cancer of the stomach. Sickness of the stomach, produced by indigestion, is generally relieved by pepsin, which is sometimes able, also, to allay the vomiting of pregnancy. Infantile diarrhœa, excited by the presence of undigested food in the intestinal tube, is markedly benefited by the administration of pepsin. The most satisfactory shape in which to administer pepsin is in its pure form, as the saccharated pepsin is too weak to have much digestive power:—

℞ Pepsini puri (in lamellis), ... ʒj.
Ext. nucis vomicæ, ... gr. v.
Pulv. ipecac., ... gr. ij.
Pulv. aromat., ... gr. xv.
M. et ft. pil. vel capsulæ no. xxx.
Sig.: Take one immediately after meals for atonic dyspepsia.

℞ Glycerol. pepsin., ... f℥j.
Acid. hydrochlor. dilut., ... fʒj.
Aquæ anethi, ... f℥iss.
M. Sig.: Take a teaspoonful after meals for indigestion.

℞ Pepsini puri (in lamellis), ... gr. cc.
Strychninæ sulphatis, ... gr. ¼.
Aloini, ... gr. ij.
Ol. menth. pip., ... ♏j.
M. et ft. capsulæ no. xx.
Sig.: A capsule after meals. For atonic dyspepsia accompanied by constipation.

Rennet-wine is obtained by macerating calves' stomachs in sherry or other light wine. It is useful in apepsia in infants; but the glycerite of calf-pepsin is a more active and efficient preparation.

PERSIA.—Cudbear.

Pharmacology.—A dark, purplish powder, prepared from certain lichens (**Lecanora tartarea,** and other species). It yields a coloring matter to alcohol, and is principally used in dyeing. The tincture of cudbear, tinctura persionis, is used as a coloring agent for liquids.

PETROLEUM.—Rock-Oil.

Preparations.

Petrolatum (U. S. P.).—Petroleum Ointment. A semi-solid substance, consisting of hydrocarbons, chiefly of the marsh-gas series, obtained by distilling off the lighter and more volatile portions from American petroleum and purifying the residue.

Rhigolenum.—Rhigolene. Used with atomizer to anæsthetize a part by cold.

Benzinum.—Benzine. *Dose,* ♏x-xxx, in mucilage or capsule. (See page 473.)

Pharmacology.—Petroleum is a very complex fluid, of natural origin, known from time immemorial, and found in various regions of the Old and New World. In this country the principal source of supply is the wells of Pennsylvania, though it exists abundantly in Ohio, Western Virginia, and Kentucky. Crude petroleum, though occasionally clear, usually presents a greenish tinge. Its specific gravity varies from 0.865 to 0.777. Petroleum consists chiefly of two homologous series of isomeric hydrocarbons, at one extremity of which marsh-gas is found and solid paraffin at the other. It is not a fluid of definite composition or fixed boiling-point. American petroleum consists chiefly of paraffins. Barbadoes tar, Seneca oil, and Rangoon oil are thick varieties of petroleum. The Rangoon oil contains a larger proportion of both the olefine and the benzole series than American oil. Oxygen, nitrogen, and sulphur have been found in certain varieties of petroleum, but are present as impurities, though, according to H. Vohl, all kinds of petroleum contain sulphur.

Petroleum does not saponify. It is soluble in ether, but nearly insoluble in chloroform; it is a solvent for caoutchouc and many resins. By fractional distillation and purification, it yields a number of commercial products, the lighter oils being used as solvents, the heavier for illumination, fuel, and various mechanical purposes.

Naphtha, a name which was formerly applied to the lighter varieties of crude petroleum, is now used to designate all that portion which distills over at or below 122° F. By repeated fractional distillations the most volatile hydrocarbons are obtained from naphtha. **Benzine** consists of the more volatile portions, being very inflammable, and yields

vapors, which, if combined with air, are explosive. Coal-oil for illuminating purposes consists of less volatile hydrocarbons, which should not evolve explosive vapors under 110° F., and the better oils require 150° or over.

Petrolatum, petroleum-jelly, or petrolatum ointment, is "a semi-solid substance, consisting of hydrocarbons, chiefly of the marsh-gas series ($C_{16}H_{34}$, etc.), obtained by distilling off the lighter and more volatile portions from American petroleum and purifying the residue." It has a melting-point about 104° to 125° F., the first constituting the softer, the second the firmer variety. It is an amorphous, pale-yellowish, odorless, tasteless, or nearly so, transparent, fatty substance, in thin layers more or less fluorescent. Petroleum is insoluble in water, scarcely soluble in cold absolute alcohol, soluble in 64 parts of boiling absolute alcohol, soluble in ether, chloroform, fixed and volatile oils. Petrolatum is commonly sold as cosmoline, vaseline, aboline, etc. It does not become rancid, and is used as a basis for ointments as a substitute for lard. It can also be obtained as a liquid oil by the name of fluid cosmoline, vaseline, etc. The properties and actions of benzine have already been described.

Physiological Action.—Petroleum possesses decided antiseptic power, is stimulant, and, taken internally in small quantities, is antispasmodic, diaphoretic, and expectorant. It disinfects the gastro-intestinal and respiratory mucous tracts. In large doses it gives rise to headache, vertigo, pain in the throat and stomach, palpitation of the heart, vomiting, and tetanic spasm.

Therapy.—Rock-oil is seldom professionally prescribed, but enjoys considerable popular repute both as an internal and external remedy. As a counter-irritant it is used in chronic rheumatism, synovitis, sprains, chilblains, and paralysis. It is likewise applied to the neck or chest for inflammatory affections of the throat and air-passages. Petroleum, alone or combined with other drugs, has been employed in psoriasis, eczema, seborrhœa, scabies, and almost every variety of skin disease. In eczema, Kaposi recommends the following:—

℞ Petrolati,
Emplast. plumbi, ... āā ℥ss.
Dissolve and thoroughly incorporate with the aid of heat, and add a little oil of bergamot to flavor, if desired.
Sig.: Apply to the affected surface on soft cotton or linen.

The stimulating properties of petroleum render it of service in loss of hair and alopecia circumscripta. Petrolatum has been widely employed as an unguent, and as a basis with which to incorporate more active topical medicaments. It is cleanly, devoid of odor, is not subject to alteration, and is available when the object is solely to cover the in-

tegument with a bland protective layer. It frequently happens, however, that petrolatum contains irritant constituents which have not been removed in the process of manufacture, and which render this substance useful as a stimulant ointment.

When it is desired that a fatty material should penetrate the skin, one of the animal fats—as lard, suet, butter, or lanolin—is entitled to the preference as an ointment base.*

Liquid cosmoline, vaseline, and other similar, petroleum, liquid fats are now prepared and are available as applications for bougies, catheters, and other instruments. Liquid petrolatum, in one of the forms named, has also been employed, by means of the atomizer, in inflammatory conditions of the nares, and after operations upon these and other parts of the body. Liquid petrolatum has also been used as a menstruum for suspending various substances in it, for external and internal use. Some clinicians have been incorporating certain of the mercurial salts in liquid petrolatum, and employing the combination for hypodermatic injections into the tissues.

Internally, the crude oil has been given, in the oil regions, in teaspoonful doses to children suffering with croup and whooping-cough, with asserted good results. It is occasionally given in chronic bronchial and pulmonary disorders with advantage. It is employed in Germany as a vermifuge, dose 20 to 30 drops. The finer qualities of petroleum have been given with success in cholera in doses of 10 to 20 drops in mint-water or white wine.

The vapor of naphtha has some irritating qualities to mucous membranes, and produces œdema of the eyelids. In a case reported recently by Dr. J. Leidy, Jr., a man was rendered unconscious by breathing the vapors of naphtha from a tank, which he was set to work to clean. The inhalation of naphtha vapor has been recommended in asthma.

Rhigolene, one of the lightest products of the distillation of petroleum, is an extremely volatile fluid, boiling at about 64½° F. So great is the rapidity of its evaporation, that local temperature is depressed to 15° F. by a spray of rhigolene. The fluid should be kept in a cool place and in tightly-corked bottles. It can be used with a hand-atomizer to produce cold for local anæsthesia, as a substitute for ether. Rhigolene sprayed upon the skin soon deadens sensibility and facilitates the performance of any brief surgical operation. Its garlicky odor and inflammability are objections to its use, except in the histological laboratory, where it is employed to freeze specimens for section-cutting. Paquelin's thermo-cautery is fed by one of the lighter hydrocarbons of petroleum.

* See Diseases of the Skin, p. 74; also Ointments and Oleates, second edition, pp. 244, 245.

PETROSELINUM.—Parsley.

Dose, gr. xxx–ʒij; or in infusion (℥j to Oj), f℥ss–ij.

APIOLINUM.—Apiol.

Dose, ♏iii–vj.

Pharmacology.—The root of Petroselinum sativum (Umbelliferæ) contains a neutral principle, **Apiin,** soluble in alcohol and water; also a volatile oil. Parsley-root is carminative, diuretic, and emmenagogue. It is likewise slightly laxative, and stimulates the circulation, the skin, and bronchial mucous membrane. The seeds of parsley yield a peculiar, oily principle known as **Apiol** (a camphoraceous substance, insoluble in water, crystallizing in fine needles), and an essential oil. The alcoholic solution of a petrol-ethereal extract leaves behind, upon evaporation, a product which, if treated by caustic soda, yields a thick, reddish liquid, which boils at 275° C. (527° F.), and has a specific gravity of 1.113. To this substance, which is the true active principle of the plant, M. Chapoteaut has given the name **Apioline.** It is dispensed in capsules of 20 centigrammes or 3 minims each. A new principle, termed **Cariol,** has recently been extracted from the same source by Mourgues and Laborde, who have studied the physiological effects of the active principles.

Physiological Action.—Thrown under the skin or into a vein of guinea-pigs, cariol determined genital hyperæmia, increased urination, and, subsequently, general tremors and slight convulsions, paresis or motor inco-ordination, and, finally, death from asphyxia. The spinal cord in the dorso-lumbar region was markedly congested. The uterine vessels of a bitch became engorged when cariol was injected into the circulation. Apiol causes congestion of the uterus and ovaries, and favors the occurrence of the menstrual discharge. Both apiol and cariol possess excito-motor properties, and their physiological action justifies their employment in genito-spinal atony.*

Therapy.—The fresh root of parsley is preferred, of which a hot infusion is administered in amenorrhœa and dysmenorrhœa. Parsley is also useful as a diuretic in dropsy, strangury, gonorrhœa, etc. Owing to a favorable report from a commission of the French Academy, apiol for a time was employed in malarial affections as a substitute for quinine, but, being found to be much inferior in antiperiodic action, it is at present seldom prescribed, except as an emmenagogue. It is said to be not abortifacient. In cases of scanty or deficient menstruation, with pains, etc., 3 to 5 minims in a capsule can be given after meals, thrice daily, for a week before the expected period. Apiol is especially appropriate when amenorrhœa depends upon anæmia.

* La Tribune Médicale, Nos. 2, 3, and 4, 1891.

PHENACETINE.—Para-Acetphenitidin.

Dose, gr. ii–viij.

Pharmacology.—A coal-tar product, analogous in composition to acetanilid, occurring in white, crystalline powder, of slightly bitter taste, without odor; soluble in alcohol, glycerin, lactic acid, and sparingly in water. It is not toxic in ordinary doses, and does not appear to be followed by dangerous depression, as is the case with some other members of the aromatic group of coal-tar products. The drug should be chemically pure.* It is stated that some pharmacists have dispensed phenacetine mixed with acetanilid, on account of the lower price of the latter. The comparative solubility of the two substances in water affords a ready means of detecting this adulteration.

Physiological Action.—A nervous sedative, with little effect upon the circulation. In very large amounts, Hare claims that it is more apt to disintegrate the blood than antipyrin, but its influence upon other vital functions is not so severe, and it is therefore less dangerous. Phenacetine is not, however, totally devoid of toxic influence. Cases have been reported in which vomiting, collapse, cyanosis, vertigo, profuse sweats, and an urticarial rash have followed its administration. These after-effects are of less frequent occurrence than those produced by antifebrin or antipyrin.† Phenacetine slightly reduces normal bodily heat, but more decidedly when pyrexia is present. It acts upon sensory nerves and relieves pain and spasm. In some cases a hypnotic effect seems to be produced. It favors the action of the skin and kidneys, but is not decidedly diuretic.

Therapy.—Phenacetine was originally introduced into medical practice as an antipyretic, and subsequently was found to possess analgesic powers, resembling antipyrin in this respect. In diseases attended by hyperpyrexia, such as rheumatism, pneumonia, typhoid fever, and phthisis pulmonalis, phenacetine exerts a very happy effect in about half the dose of antipyrin, the ordinary dose being from 3 to 8 grains (Hinsberg and Kast). The mortality of the typhoid fever of children has been very materially reduced by the employment of phenacetine or acetanilid. The fall of temperature does not occur until half an hour after the drug has been taken, and the reduction continues for four to eight hours. As an antipyretic, it is considered by many good authorities as the safest and most efficient member of the aniline group. Some, on the contrary, have not so much confidence in it as in other drugs for the prompt and certain relief of pyrexia. In epidemic influenza, phenacetine rapidly relieves the muscular pains and favors diaphoresis; the catarrhal symptoms subse-

* Pharmaceutical Record, December 1, 1890.

† Dr. Goldmann, "Drawbacks to the Use of the New Antipyretics," Medical Bulletin, June, 1890.

quently require other remedies. In ordinary colds, one or two 5-grain powders of phenacetine rapidly remove all the symptoms. Where fever is present, the combination of salol with phenacetine is especially useful in influenza and rheumatism. Pills containing 2½ grains each of phenacetine-Bayer and salol are furnished by the well-known firm of W. H. Schieffelin & Co., New York. The analgesic effects of phenacetine are very marked in various forms of headache, including migraine and the headaches from eye-strain, having the advantage over antipyrin in not so frequently causing a rash. In the neuralgic pains of tabes dorsalis, in herpes zoster, and intercostal neuralgia, 5-grain doses, given every hour for three or four hours, usually afford complete relief and cause sleep. Phenacetine is extremely useful in chronic neuritis, and, according to Kater, is unsurpassed in the treatment of cerebral disorder due to excessive indulgence in alcoholic drinks.

In whooping-cough, ½-grain doses dissolved in 10 drops of glycerin are readily taken by children, and afford prompt relief, permitting sleep and ameliorating the attacks.

In delirium, a dose of 10 grains will usually afford a quiet night. Franz Mahnert* considers phenacetine a specific in acute articular rheumatism, as it reduces fever, relieves pain, and lessens the duration of the attack. It has been found useful in some cases of gonorrhœal rheumatism, and is worthy of more extended trial in this rebellious affection. Given several hours before the time of the paroxysm of intermittent fever, it prevents the chill, but does not obviate its recurrence. In insomnia from simple exhaustion, phenacetine acts admirably.

PHENOCOLLUM HYDROCHLORICUM.—Phenocoll Hydrochlorate.

Dose, gr. viii–xx.

Pharmacology.—Phenocoll is derived from glycocoll, or amido-acetic acid and phenetidin, the water being abstracted. The new combination is a phenacetine, which, by the introduction of the salt-forming amido group in the acetyl radicle, is rendered readily soluble. The hydrochlorate is soluble in about 16 parts of water at 17° C. (62.6° F.), and the solution is of neutral reaction. The salt crystallizes out of hot water in cubes similar to those of antipyrin; out of alcohol, in which it readily dissolves only by the aid of heat, it crystallizes in needles. The pure base, phenocollum purum, may be obtained by the action of ammonia, caustic alkali, or alkaline carbonate upon a solution of the salt, and occurs in the form of white, matted needles, which contain 1 part of water of crystallization. Hydrated phenocoll melts at about 95° C. (203° F.), the anhydrous form at 100.5° C. (212.9° F.). On account of

* Annual Univ. Med. Sciences, 1890, vol. v, p. A-105.

its solubility in cold water, the salt is preferable to the pure base for use in medicine. Phenocoll is fairly stable when boiled in a dilute solution of an alkaline caustic or carbonate, though prolonged boiling causes it to separate into phenetidin and glycocoll. It is similar in its behavior toward weakened acids. After long boiling in concentrated hydrochloric acid, it is partly split up into phenetidin hydrochlorate and glycocoll.

Phenocoll hydrochlorate is best administered in the form of powder. The aqueous solution, neutral at first, develops an alkaline reaction at the end of the second day.

Physiological Action.—Phenocoll exerts no deleterious influence upon animals, and does not affect the composition of the blood. A dose of 23 grains was followed by no evil consequences in the rabbit. In the human subject it is well tolerated by the stomach, and seems to have no injurious effect upon the kidneys. After ingestion of about 5 grammes, the urine assumes a brownish or blackish-red color. The coloration usually deepens when the urine is left long exposed to the air. Upon the addition of tincture of chloride of iron the color becomes still darker. The drug is eliminated rapidly, and, twenty-four hours after discontinuance, the reaction with the tincture of iron can no longer be obtained.

Therapy.—In the dose of 5 grains, phenocoll has reduced temperature in typhoid fever and pneumonia three degrees or more without causing collapse or cyanosis. In the hectic fever of phthisis, Dr. Hertel found that 8-grain doses, thrice repeated at hourly intervals, reduced temperature 1° C.; 15-grain doses effected a diminution of 1½° C. within a few hours, and the reduction continued for about two hours. Five grammes (75 grains), given in divided doses throughout the day, occasioned an almost complete defervescence. In acute inflammatory rheumatism Hertel found daily doses of 75 grains valuable in the alleviation of pain, but with little direct influence upon the fever. As soon as pain was abolished, however, the temperature fell to normal. Sweating was occasioned, and, in some instances, Cohnheim observed chilliness to attend the re-ascent of temperature. In some cases phenocoll was successful when other antirheumatic remedies had failed. Cohnheim obtained no good results from its use in chronic rheumatism, and in the hands of Hertel it produced no effect upon a case of gonorrhœal rheumatism. Professor Albertoni states that he has extensively employed phenocoll in malaria, and that excellent results were effected in a number of severe cases. Cohnheim found the remedy efficacious in a number of cases of neuralgia, especially when due to influenza. It was of no service in hysteria or bronchial asthma.

PHOSPHORUS (U. S. P.).—**Phosphorus.**

Dose, gr. $\frac{1}{150}$–$\frac{1}{12}$.

Preparations.

Acidum Phosphoricum (U. S. P.).—Phosphoric Acid (page 384). *Dose,* ♏ii–xx.

Oleum Phosphoratum (U. S. P.).—Phosphorated Oil (1 per cent.). *Dose,* ♏i–v.

Pilulæ Phosphori (U. S. P.).—Phosphorus Pills (each gr. $\frac{1}{100}$). *Dose,* one to five.

Zinci Phosphidum (U. S. P.).—Phosphide of Zinc. *Dose,* gr. $\frac{1}{24}$–$\frac{1}{10}$.

Liquor Phosphori (N. F.).—Thompson's Solution of Phosphorus (each fluidrachm contains about $\frac{1}{24}$ grain of phosphorus preserved in absolute alcohol and glycerin). *Dose,* f℥j.

Elixir Phosphori (N. F.).—Elixir of Phosphorus (each fluidrachm contains $\frac{1}{50}$ grain in glycerin, alcohol, and elixir). *Dose,* f℥i–ij.

Elixir Phosphori et Nucis Vomicæ (N. F.).—Elixir of Phosphorus and Nux Vomica (same as the preceding, except that to each fluidrachm is added the equivalent of 2 minims of tincture of nux vomica). *Dose,* f℥i–ij.

Tinctura Phosphori (*Bellevue*).—Tincture of Phosphorus (used in Bellevue Hospital). Twice the strength of the solution of phosphorus of the National Formulary. *Dose,* ♏x–xxx.

Resina Phosphori.—Resin containing 4 per cent. of Phosphorus. *Dose,* gr. ¼–j.

The officinal hypophosphites are of lime, iron, potassium, and sodium; their preparations are:—

Syrupus Hypophosphitum (U. S. P.).—Syrup of Hypophosphites (contains of the lime salt 35, sodium and potassium salts 12 each, citric acid 1, spirit of lemon 2, sugar 500, and water q. s. ad 1000 parts). *Dose,* f℥j–℥j.

Syrupus Hypophosphitum cum Ferro (U. S. P.).—Syrup of Hypophosphites with Iron (1 part of lactate of iron added to 99 parts of the preceding). *Dose,* f℥j–℥j.

Syrupus Hypophosphitum Compositus (N. F.).—Compound Syrup of the Hypophosphites (each fluidrachm contains lime hypophosphite, gr. ij; sodium and potassium hypophosphite, āā gr. j; iron and manganese hypophosphite, gr. ⅙; quinine hydrochlorate, gr. $\frac{1}{16}$; and tincture of nux vomica, ♏i¼). *Dose,* f℥j–℥j.

Liquor Hypophosphitum Acidus.—Acid Solution of the Hypophosphites. *Dose,* f℥i–iv.

The officinal phosphates are of ammonia, iron (also pyrophosphate of iron), soda (and sodium pyrophosphate), and the precipitated phosphate of lime. The preparations are:—

Syrupus Calcii Lactophosphatis (U. S. P.).—Syrup of the Lactophosphate of Lime (contains of the precipitated phosphate 22, lactic acid 33, orange-flower water 80, sugar 600, hydrochloric acid, water of ammonia, and water q. s. ad 1000 parts). *Dose,* f℥i–iv.

Syrupus Ferri, Quininæ, et Strychninæ Phosphatum (U. S. P.).—Syrup of the Phosphates of Iron, Quinine, and Strychnine (contains iron phosphate 1.33, quinine 1.33, strychnine 0.04, phosphoric acid 8, sugar 60, water q. s. ad 100 parts). Each drachm represents of strychnine about gr $\frac{1}{32}$. *Dose,* f℥j.

Syrupus Phosphatum Compositus (N. F.).—Compound Syrup of the Phosphates, or Parrish's Chemical Food (each fluidrachm contains, of lime phosphate, gr. ij; iron phosphate and ammonium phosphate, gr. j each; and smaller quantities of phosphates of sodium and of potassium). *Dose,* f℥i–ij.

Pharmacology.—Phosphorus, a non-metallic element, was obtained by Brandt, in 1669, from urine. It is a soft, flesh-colored solid, very inflammable, oxidizing upon exposure to the air. Phosphorus melts at 110° F., and friction causes it to ignite at ordinary temperature. It possesses an alliaceous odor, is insoluble in water, sparingly soluble in alcohol,

ether, and chloroform; more soluble in oils, and dissolves readily in bisulphide of carbon. Occurs in nature as tribasic phosphate of lime in primitive and volcanic rocks, and in the bones of vertebrates. In brain- and nerve- tissue it exists in combination with fat as lecithin; and in all vascular structures, in the form of triple phosphate, it is an important constituent. It is excreted in small quantity normally by the urine in the form of phosphates; occasionally, when oxidation is interfered with or an excess of phosphorus introduced into the blood, it is excreted in its own form by the breath, urine, and perspiration, making the person luminous. Phosphorus is likewise eliminated by the liver.

Physiological Action.—In medicinal doses the action of phosphorus upon the nervous system is that of a tonic and stimulant, and it also accelerates cell-growth in organs and tissues and particularly in the skin. On the circulation it acts primarily as a stimulant, making the pulse fuller and more frequent; the capillary expansion is flushed, and free perspiration follows; as a consequence, the temperature of the surface is at first slightly raised, but subsequently falls several degrees. The kidneys are also flushed, the quantity of urine becomes larger, the proportion of urates and urea is decidedly increased; hæmaturia often results from a poisonous dose. No influence is observed upon the digestion from small doses, though larger ones cause irritation. Muscular power is enhanced and the sexual appetite stimulated. Mental operations are easily performed, and it is said that tactile sensibility is heightened. The body-weight is increased. Jaundice may occur from interference with the function of the liver, and biliary acids may appear in the urine. Wegner has shown that phosphorus also exerts a marked influence in promoting the growth of bone. Phosphorus in substance is very inflammable and produces extremely painful burns.

Toxic Effects.—In single poisonous doses phosphorus is a violent irritant, causing gastric inflammation; and if death does not quickly occur, fatty degeneration of muscular tissues and acute yellow atrophy of the liver will follow. This result may also succeed the medicinal use of phosphorus, when continued too long, or if the dose be considerable. When the poisonous action is very slow, as where workmen are exposed to the fumes of phosphorus in making friction-matches, the toxic effects are shown by the death of certain bones, particularly the jaw-bone. This occurs frequently, and is known as "phosphor-necrosis."

Acute Phosphorus Poisoning.—When, as not rarely happens, an infusion of match-heads is swallowed, or phosphorus-paste* used for poisoning

* Phosphorus-paste, for destruction of house-vermin, is made by rubbing together 6 parts of phosphorus and sulphur with 6 parts of cold water until they liquefy. Then add 2 parts mustard-flour, 8 parts of sugar, and 12 of rye-flour, making a paste. To be kept closely stopped in tin boxes.

rats is taken with suicidal intent, or an overdose of a medicinal preparation of crude phosphorus is swallowed, the first symptom is pain and burning at the epigastrium, with vomiting. The vomited matter and even the stools are sometimes phosphorescent, with intestinal irritation and purging, and death occurs from exhaustion. The blood is robbed of its oxygen, becomes black, unusually liquid, and loaded with products of decomposition; the capillary tissues yield and the extravasations of blood produce purpura, hæmaturia, and hæmorrhages. Temperature is reduced, jaundice is frequent, and convulsions and coma are not uncommon. One and a half grains of phosphorus have proved fatal.

Antidotes.—The best antidote is sulphate of copper, used freely as an emetic, followed by sulphate of magnesia to clear the intestinal canal. Albuminous and mucilaginous drinks, in which magnesia hydrate is suspended, are useful. Oil, being a solvent of phosphorus, should be avoided, except old French oil of turpentine, which contains oxygen and is a chemical antidote. Oxygen inhalations have been proposed to overcome the depression due to altered blood. If the poison has been retained for a time, death will occur from the fatty degeneration of the stomach, liver, and other organs. Phosphor-necrosis may be prevented by thorough ventilation of the work-room, or by the workmen wearing masks or respirators, covering the mouth and nose. It is also believed that the vapor of turpentine, carried in a small bottle suspended from the neck while at work, exerts some protective influence. Since carious teeth favor the occurrence of phosphor-necrosis, those working amid these fumes should be warned to keep their teeth in good condition.

Therapy.—In neurasthenia, or nervous debility, where the system is weakened by anxiety, overwork, or sexual excesses, and in neuralgia, phosphorus is a valuable tonic and restorative, but has less control over pain than many other agents.

Phosphorus is not infrequently of service in the treatment of angina pectoris. In reduced nutrition of nervous centres this remedy is valuable, as in atheroma of the cerebral vessels, white softening, insomnia of the aged, hysterical paralysis and melancholia, morphinomania, and chronic alcoholism. It checks sweating due to nervous debility. Phosphorus may be employed as a restorative after typhoid fever or typhoid pneumonia, and phosphorated oil is said to be valuable in intermittent fever. In anæmia, small doses in conjunction with iron are of considerable service. In so-called pernicious anæmia, or anhæmatosis, small doses of phosphorus seem to have some influence in checking the progress of the disease. In rickets and osteomalacia, also, clinical experience has pronounced in favor of phosphorus, especially in the form of oleum phosphoratum given with codliver-oil.

When, in eruptive fevers (in scarlatina, measles, etc.), the exanthem does not come out or it recedes, the administration of phosphorus is often resorted to with advantage.

In skin diseases, phosphorus and its compounds are useful as substitutes for arsenic, and in some cases are superior to this drug. In crops of boils, acne indurata or inveterata, and eczema of nervous origin, the phosphate of lime or the alkaline hypophosphites are highly serviceable.

Phosphates and Hypophosphites.—In some cases, medicinal doses of phosphorus cause feebleness of the heart's action with threatening collapse, or acute gastric pain; and, in others, fatty degeneration of the muscles and viscera. This does not occur after using the salts of phosphoric and hypophosphoric acids and their preparations. The phosphates have physiological actions and therapeutical powers differing from those of phosphorus. The phosphate of soda, for instance, is a valuable cholagogue and is slightly laxative, making it of special service in treating children who pass clay-colored fæces, and also in catarrhal jaundice, owing to its action upon the liver. The phosphate of soda is of benefit in rheumatism, either alone or combined, thus:—

℞ Sodii phosphat.,
Acidi salicylici, ... āā gr. c.
M. et ft. capsulæ no. xx.
Sig.: A capsule or two every two hours for rheumatism.

For gout and rheumatism, Dr. F. L. Satterlee recommends the following prescription containing the phosphate of soda:—

℞ Lithii benzoat., ... ʒss.
Sodii bromid.,
Potassii carbonat. pur., ... ʒij.
Potassii acetat., ... ℥iss.
Sodii phosphat., ... ℥ss.
Syr. zingiberis,
Aq. menth. pip., ... āā f℥vj.
M. Sig.: A teaspoonful to a tablespoonful in half a glass of water every four or six hours after food.

The phosphate of lime, made soluble by combination with lactic acid in the form of the syrup of lacto-phosphate of calcium, is a valuable reconstructive and tonic in feeble children with deficient development of bone, and also in surgery, in treating ununited fracture. Exhaustion and anæmia, produced by long-continued suppuration or lactation, leucorrhœa, or chronic diarrhœa, are benefited by this preparation, which is also useful in caries. The compound syrup of the phosphates, or chemical food, has been found to be especially serviceable in these cases. The hypophosphites have been largely used and highly extolled by Dr. Churchill in the treatment of pulmonary consumption,

especially the alkaline hypophosphites, which should be perfectly pure, like those of Dr. R. W. Gardner, of New York. The object of treatment being to obtain calcareous degeneration of the tubercles, the hypophosphite of lime may be administered alone, having the advantage of being nearly tasteless; it may be given in doses of gr. v–xx in pill form, or with an equal quantity of milk or cane-sugar. The following prescription, containing the hypophosphites, is suitable as a tonic, especially in chronic bronchitis:—

℞ Acidi phosphorici dil.,	. . . .	f℥iij.
Syrup. pruni Virg.,	. . . .	f℥ij.
Syr. hypophosphitum comp.,	. . . . q. s. ad	f℥v.

M. Sig.: A teaspoonful in water three or four times a day.

Caution.—As a subject of interest and possible importance, it should be mentioned that the hypophosphites should not be triturated in a mortar, as they are liable to explode. Dr. H. Gifford, of Syracuse, while triturating a mixture containing 3 parts of hypophosphite of lime and 1 of hypophosphite of soda, made this discovery, the compound exploding like gunpowder, severely burning his face and eyes and destroying the sight of one of them.

PHYSOSTIGMA (U. S. P.).—Calabar Bean.

Preparations.

Extractum Physostigmatis (U. S. P.).—Extract of Physostigma. *Dose*, gr. $\frac{1}{6}$–iv.

Tinctura Physostigmatis (U. S. P.).—Tincture of Physostigma (10 per cent.). *Dose*, ♏xv–xl.

Physostigminæ Salicylas (U. S. P.).—Salicylate of Physostigmine. *Dose*, $\frac{1}{64}$–$\frac{1}{20}$.

The hydrobromate and sulphate of physostigmine are also employed in doses of from $\frac{1}{60}$–$\frac{1}{20}$ grain.

Pharmacology.—The ordeal bean of old Calabar is the seed of Physostigma venenosum (Leguminosæ, Papilionaceæ), growing in Western Africa along the river Niger. It contains the alkaloid **Physostigmine** (also known as **Eserine**) and **Calabarine**, starchy matters, oils, etc. The salts of physostigmine vary in solubility; that with salicylic acid is soluble and permanent, and has been made officinal. Jobst and Hesse, in 1864, first isolated the active principle as an amorphous alkaloid, to which they gave the name of physostigmine. Subsequently, a crystalline, alkaloidal principle was found in the seeds by Vée and Leven, who gave it the name of eserine; the former was tasteless, the latter has a bitter taste. In physiological effects they are analogous, and they are now regarded as different forms of the same substance. Bihringer has recently discovered in Calabar bean a new alkaloid, which he proposes to call **Eseridine.** It is said to act as a laxative or motor excitant, and to be six times weaker than physostigmine. A substance termed **Physosterin,** related to cholesterin, is also present in physostigma.

Physiological Action and Toxic Effects.—In large doses, physostigma is a powerful poison, producing extreme muscular debility, vomiting, slow and weak pulse; it causes death either by cardiac syncope or, in smaller quantity, by paralysis of the respiratory centre and suffocation. Atropine counteracts the respiratory depression and strychnine stimulates the cord, and thus act as physiological antidotes. Applied to the surface of the body, no effect is observed unless absorption occurs (except, when introduced into the eye, it causes contraction of the pupil, beginning in about fifteen minutes and lasting for about eight hours, attended by slight twitching of the lids, supra-orbital pain, dimness of vision, fall of intra-ocular tension, spasm of accommodation, and myopia). The pupil contraction is held to be due to paralysis of the peripheral vaso-motor nerve-fibres, and to stimulation of the fibres of the third nerve supplying the iris (Farquharson). Contraction of the pupil may also be produced by the internal administration of the drug, but this result does not always follow. This fact, as Phillips remarks, may aid in distinguishing poisoning due to physostigma from that of opium. The brain is not affected, but the spinal cord suffers great depression of both motor and reflex activity. The conductivity of the motor nerves is also reduced. The pulse and respiration become slower and fuller after small doses, the arterial tension being at first increased; but in larger amounts, as the system becomes more influenced by the toxic action of the drug, the pulse becomes feeble and irregular and the arterial tension falls. This is explained by the primary stimulation and subsequent exhaustion of the peripheral cardiac filaments of the vagi. The secretions are slightly increased by Calabar bean, and vomiting and retching are apt to occur. Peristaltic action as well as the intestinal fluids are increased, and diarrhœa is a usual physiological consequence. The sulphate of eserine is said to have excited the pregnant womb to contraction. The bladder and spleen also contract under the influence of physostigma. The active principle is largely excreted by the kidneys, and likewise by the saliva and bile, and has even been found in the gastric secretions after intra-venous injection.

Therapy.—Eserine, or physostigmine, is used by oculists to break up adhesions of the iris, diminish intra-ocular tension, and prevent the prolapse of the iris after wound or ulcer of the cornea. It is serviceable in treating glaucoma; a solution of gr. ij to f℥j of distilled water, being instilled into the eye every fifteen minutes, soon gives relief. It is useful in photophobia, reducing the amount of light by contracting the pupil, and diminishing the blood-supply by emptying the blood-vessels. Eserine is also employed in neuralgia of the eyeball, and to counteract the excessive action of atropine. In ulceration or suppuration of the cornea

and in strumous ophthalmia the local action of eserine is very beneficial. Internally, it is useful in constipation due to defective secretion and to insufficient peristalsis, combined with other remedies, such as belladonna.

℞ Ext. physostigmatis, ... gr. iij.
Ext. belladonnæ alc., ... gr. j.
Res. podophylli, ... gr. iij.
Ol. cajuputi, ... ♏iv.
M. et ft. pil. no. xij.
Sig.: Take one or two at bed-time.

Bartholow gives the following formula:—

℞ Tinct. physostigmatis,
Tinct. nucis vomicæ,
Tinct. belladonnæ, ... āā f℥ij.
M. Sig.: Thirty drops in water morning and evening for constipation of the bowels.

This combination is useful in treating the digestive disorders of women at the change of life, relieving headache, vertigo, and flatulence. In tetanus physostigma gives excellent results, recovery following in more than half the cases. Care should be taken that the extract or other preparation used is of good quality, and it should be pushed until decided physiological effects are produced, as recommended by Fraser; 1 grain by the stomach, or $\frac{1}{3}$ grain hypodermatically, of a good extract, is enough to commence with, repeated every two hours, and increased or reduced, according to effect. In other nerve affections, chorea, and epilepsy, and in progressive paralysis, great improvement has been noted. Physostigma has been successfully used in infantile convulsions after the failure of chloroform. In convulsive disorders of individual muscles of the face (histrionic spasm, tic, twitching of orbicularis, etc.), good results follow its employment. Calabar bean has likewise proved beneficial in writers' cramp. Temporary improvement, or arrested progress, was observed by Ringer and Murrell in paraplegia supposed to be due to myelitis. The same authorities saw improvement follow administration of the drug in locomotor ataxia. Physostigma is also capable of controlling the night-sweats of phthisis; at least, in some cases. Murrell gave $\frac{1}{10}$ grain of extract in pill two or three times during the night, or $\frac{1}{60}$ grain of an eserine salt, and found that not only was sweating suppressed for the time, but that in some instances it did not recur for three or four weeks.

In strychnine poisoning, while the symptoms are modified, there has been no case of recovery from the use of physostigmine alone, but the bromides might be combined with it advantageously. In some affections of the air-passages, bronchitis, congestion of the lungs, and pneumonia, physostigma may be used to lower the excitability of the vagus and the

activity of the heart and respiration. On account of its tonic effect upon the muscular coat of the bronchi, this drug is occasionally serviceable in bronchial asthma and emphysema. The tincture of physostigma, when well made, is a good preparation, but for hypodermatic and ophthalmological purposes the salicylate of physostigmine is preferable.

PHYTOLACCA.—Poke.

PHYTOLACCÆ BACCA (U. S. P.).—Poke-Fruit.

PHYTOLACCÆ RADIX (U. S. P.).—Poke-Root.

Preparations.

Pulvis Phytolaccæ Radicis.—Powdered Phytolacca-Root. *Dose*, gr. i–v.
Extractum Phytolaccæ Radicis Fluidum.—Fluid Extract of Phytolacca. *Dose*, ♏v–f℥j.
Tinctura Phytolaccæ Radicis.—Tincture of Phytolacca (1 to 10). *Dose*, ♏x–f℥j.

Pharmacology.—The fruit and root of Phytolacca decandra (Phytolaccaceæ) are each officinal. The active principle has not been isolated; but the plant contains a resin and a neutral principle, **Phytolaccin,** and **Phytolaccic acid**; also tannin, oil, starch, etc. The berries are dark, purple, globular, about $\frac{1}{3}$ inch in diameter, comprising ten carpels, each holding one black seed. The juice is red, acrid, rather sweet to the taste, as is also the root.

Physiological Action.—The powdered root is irritating to the air-passages, and when inhaled causes pains in chest, back, and abdomen, with injection and irritation of the eyes, and occasionally vomiting and purging. Applied to the skin, it occasions an erythematous eruption and excoriations. Poke is emetic, cathartic, narcotic, and is claimed to be alterative. As it only acts slowly, and creates much nausea and depression, it is never used as an emetic. It reduces the force of the pulse and frequency of the heart's action, and also the rate of respiration. It acts decidedly upon the nerve-centres, paralyzing the cord and medulla, death being produced by carbonic-acid poisoning from failure of respiration. As it is a remedy easily obtained and used by a class of "herb-doctors," it is not surprising that cases of fatal poisoning have occurred. The antidotes are the diffusible stimulants, ammonia, alcohol, and ether, with hypodermatic injections of digitalis and small doses of morphine and atropine, with artificial respiration and counter-irritation.

Therapy.—In follicular pharyngitis, tonsillitis, granular eyelids, mastitis, malignant disease, varicose veins and ulcers, and in a large variety of skin disorders, such as chronic eczema, sycosis, favus, and abscesses, various observers have reported good results from the external and internal use of poke-root. The following formulæ are recommended:—

℞ Pulveris phytolaccæ radicis, ... ʒj.
Camphoræ, ... gr. x.
Extracti belladonnæ alc., ... ʒj.
Ungt. zinci oxidi benz., ... ℥j.

M. For chronic ulcers, fissure and fistula, and mammary abscesses.

℞ Pulveris phytolaccæ radicis, ... ʒj.
Ungt. resinæ comp., ... ℥j.

M. Useful in boils and carbuncles.

℞ Pulveris phytolaccæ radicis, ... ʒj.
Mentholi, ... gr. x.
Lanolini, ... ℥j.

M. Useful in chronic eczema and chronic sycosis.

The pain produced by burns is alleviated by the local application of phytolacca. An abstract of poke-root and fluid extract have also been used. They are esteemed valuable in the treatment of syphilis, scrofula, rheumatism, and in chronic skin diseases. The tincture and the fluid extract have yielded good results in chronic rheumatism and rheumatic swelling of the joints. Phytolacca is highly esteemed as a remedy for acute mastitis, applied locally and taken internally. M. M. Griffith claims that this remedy has very decided power in diminishing obesity.

PICHI. See Fabiana Imbricata, page 623.

PICROTOXINUM (U. S. P.).—**Picrotoxin.**

A neutral principle prepared from the seeds of Anamirta paniculata (Menispermaceæ) or Cocculus Indicus (see page 556).

PILOCARPUS (U. S. P.).—**Pilocarpus, Jaborandi.**

Dose, gr. x–ʒj.

Preparations.

Extractum Pilocarpi Fluidum (U. S. P.).—Fluid Extract of Pilocarpus. *Dose,* ♏x–lx.
Pilocarpinæ Hydrochloras (U. S. P.).—Hydrochlorate of Pilocarpine. *Dose,* gr. $\frac{1}{12}$–$\frac{1}{4}$.
Infusum Pilocarpi.—Infusion of Jaborandi (ʒj–Oj). *Dose,* f℥ij–℥iv.

Pharmacology.—Pilocarpus is the leaflets of Pilocarpus pinnatifolius (Rutaceæ) of Brazil. They contain an alkaloid, **Pilocarpine** ($\frac{1}{4}$ to $\frac{1}{2}$, or 1 per cent.), **Jaborine,** volatile oil, and probably a peculiar acid. The active principles are soluble in alcohol, but only imperfectly so in water.

Physiological Action.—In about fifteen minutes after jaborandi has been swallowed, the face flushes and perspiration occurs, with more or less salivation; the two being related to each other in such manner that if there is little action upon the skin there will be more discharge of secretion from the salivary glands, and when the skin acts freely the salivation will be less. The profuse sweating removes not only water but other matters from the blood, as it has been found to carry off urea and certain excrementitious materials. Arterial tension is reduced and

temperature falls 1° to 4°. This action upon the skin is attributed to vasomotor paralysis, and the sialagogue action to stimulation of the peripheral nerves of the glands. Jaborandi also increases the action of the heart and respiration, but in larger doses depresses them by its paralyzing action on the vagus. Contraction of the pupil, with impaired power of accommodation, has been observed to follow its use. The same result is produced by its topical application. Atropine and muscarine are antagonistic in their effects to jaborandi or pilocarpine.

Pilocarpine readily diffuses into the blood, and is eliminated chiefly by the skin and salivary glands. Most secreting glands are similarly affected, to a greater or less degree. The gastric and pancreatic fluids are decidedly augmented. A certain though less powerful stimulant effect is exerted upon the liver. The lachrymal, mammary, and bronchial mucous glands are also excited. It increases the discharge of urea by the kidneys, but not the urinary water. It causes contractions of the uterus, and may induce abortion; it also reduces the size of the spleen. Children are less susceptible than adults to the action of pilocarpine. Demme, of Berne, has observed that under 4 years of age the action of this substance is more decided upon the salivary glands than upon the skin. **Jaborine,** the second alkaloid which is separated from pilocarpus, acts similarly to atropine. The presence of this alkaloid explains the different effects following the use of pilocarpine which has been improperly made. It is therefore very necessary, in using pilocarpine, or any of its preparations, to obtain them free from jaborine.

Therapy.—It has been noticed by Prentiss that under the use of pilocarpine the color of the hair darkens. It may thus be combined with a stimulant application to the scalp:—

℞ Ext. pilocarpi fl.,
Lin. saponis, ... āā f℥ss.
Spiritus odorati, ... f℥ij.

M. Sig.: To be applied to the scalp once daily, with friction, for alopecia and falling of the hair.

In cases where diaphoresis is desired in order to remove matters from the blood or reduce temperature, pilocarpus is a convenient agent. Thus, in acute erysipelas, its action is so prompt and effective that it might almost be regarded as a specific. Professor Waugh points out that the diaphoresis is at once followed by retrogression of the rash and improvement of the general condition, but that in atonic cases, when the heart is weak and perspiration cannot be induced by jaborandi, no beneficial action is observed. In diphtheria, also, it is serviceable, but the depressing effect upon the heart must be kept in mind. Pulmonary œdema, also, may follow the administration of this drug; so that,

although it is capable of detaching false membrane, it is of doubtful value, demands vigilant watchfulness, and should only be administered to previously strong individuals. Similarly, in mumps or parotitis, it often abruptly stops the course of the disease. In agalactia of nursing women, small doses of pilocarpine restore the secretion of milk. Where there is œdema or effusion, the fluid extract of jaborandi is very commonly employed, in moderate doses, to keep up the action of the skin and increase the elimination of urea. In diabetes insipidus, alternated with the fluid extract of ergot, it reduces the urinary flow very decidedly. In asthma, or hiccough, a hypodermatic injection of pilocarpine is sometimes promptly curative. Jaborandi has been advantageously employed in whooping-cough. In small doses it, or its alkaloid, is useful in chronic bronchitis and winter cough. In doses sufficient to excite free diaphoresis, this remedy has proved very efficacious in the congestive stage of pneumonia, rapidly ameliorating the local condition and reducing the fever. When atropine is administered to check night-sweats in phthisis, it may be combined with fluid extract of jaborandi, which, as pointed out by Da Costa, relieves the dryness of the throat caused by the atropine. Pilocarpine itself is by no means an inefficient remedy for this manifestation, and the hydrochlorate may be given nightly in $\frac{1}{20}$-grain dose by the mouth, with, usually, a good effect both upon the sweats and the cough. In amblyopia of tobacco and alcohol origin, and in amaurosis, pilocarpine is frequently used with good effect, and also in many other lesions and disorders of the eyeball. A few drops of a solution of pilocarpine (2 grains to the ounce) may be locally employed with advantage in rheumatic iritis. Internally, the alkaloid is sometimes beneficial in detachment of the retina, and decidedly so in optic neuritis. Its action upon the pupil enables it to be used in place of eserine. Staderini* (*Annali di Otalmologia*) advises the nitrate of pilocarpine in gr. $\frac{1}{8}$ to $\frac{1}{10}$, subcutaneously, in many inflammatory diseases of the eyes, especially in those that are the consequence of rheumatism, as episcleritis, iritis, and idiopathic optic neuritis. Nitrate of pilocarpine thus given, he states, subdues inflammatory conditions of the iris and of the ciliary body which supervene when masses of the cortical substance of the lens remain in the anterior chamber after the operation of extraction of cataract. Pilocarpine, the same writer believes, promotes the absorption of non-organized opacities in the vitreous humor, especially when these opacities are the consequence of recent infiltration. Progressive myopia, he further adds, shows improvement of vision after pilocarpine injections.

The action of jaborandi upon the glands of the skin makes it useful in many cases of chronic skin disorder, especially of the dry character.

* "Pilocarpine in Ocular Therapeutics," by G. Staderini, St. Louis Clinique, January, 1891.

Klotz has recently reported very favorable results from the hypodermatic injection of 10 to 15 drops of a 1-per-cent. solution of pilocarpine hydrochlorate in chronic eczema. The hard, dry, and fissured condition of the skin was remarkably improved. In some instances jaborandi given internally has alleviated urticaria. Small doses of jaborandi by the mouth, or of its alkaloid subcutaneously, have proved remedial in hyperidrosis and bromidrosis. Pruritus is not uncommonly relieved by this agent. The itching of jaundice is amenable to the influence of pilocarpine, provided, as Waugh remarks, that the drug is well borne and sweating occurs.

Pilocarpus can be administered for the diseases just named as follows:—

℞ Extracti pilocarpi fl., ... f℥ss.
Spiritus ætheris nitrosi,
Spiritus juniperi, ... āā f℥ij.
Syrup. limonis, ... q. s. ad f℥vj.

M. Sig.: From a half to a tablespoonful in water every two or three hours.

℞ Infus. pilocarpi,
Infus. digitalis, ... āā f℥ij.

M. Sig.: Two teaspoonfuls every two or three hours.

By Wilkowski the hypodermatic injection of pilocarpine is regarded as almost a specific in catarrhal jaundice. He attributes, moreover, a diagnostic value to the procedure. If a treatment of ten to fifteen days produces no effect upon the jaundice the presence of a malignant growth of the liver is to be suspected. For the relief of dry tongue, or aptyalism, J. P. Blackmans strongly recommends $\frac{1}{200}$ to $\frac{1}{100}$ grain of pilocarpine, inclosed in gelatin and allowed to melt on the tongue, which should be previously moistened with a little water. A moderate flow of saliva is excited within twenty-four hours, and general diaphoresis is never produced. Pilocarpine has been found useful in the exanthemata in case of suppression or retrocession of the rash.

Pilocarpine may be used hypodermatically for the same purposes as jaborandi by the stomach, and is less apt to be followed by nausea and vomiting. One-third of a grain under the skin generally causes free diaphoresis, while $\frac{1}{2}$ grain produces such an amount of sweating as to lead to dangerous degree of prostration. As a rule, the first dose should not exceed $\frac{1}{4}$ grain, and in this dose it is well borne, even by subjects of heart disease. Pilocarpine is a good substitute for the Turkish and other sweating baths in the treatment of ascites and serous effusions generally, and of œdema.

Pilocarpine subcutaneously has been employed successfully in belladonna poisoning. McGowan relates a case (*London Lancet*), in which two injections of $\frac{1}{2}$ grain each were undoubtedly the means of saving

the patient's life. It can likewise be used with much effect in the albuminuria of pregnancy. Dr. E. L. B. Godfrey has prescribed pilocarpine very advantageously in this disease as follows:—

℞ Pilocarpinæ hydrochloratis,	gr. ij.
Potassii bicarbonatis,	ʒiij.
Acidi benzoici,	ʒj.
Tinct. cardamomi,	f℥ss.
Aquæ,	q. s. ad f℥iij.

M. Sig.: A teaspoonful in water every three hours.

Pilocarpine is, however, an inappropriate remedy in œdema dependent upon disease of the heart, and should never be employed if the heart-muscle be decidedly weak and its cavities dilated. In malarial or renal dropsy, on the contrary, this alkaloid is of signal efficacy. In chronic rheumatic disorders and some skin affections such diaphoretic treatment is serviceable. Muscular rheumatism and sciatica have also been ameliorated by the same method. In acute parenchymatous inflammation of the kidneys, pilocarpine is of the greatest service, increasing the urinary water and decreasing the albumin and blood. In acute scarlatinal nephritis pilocarpine is a valuable remedy, especially employed as follows:—

℞ Extracti pilocarpi fl.,	f℥ss.
Misturæ potassii citratis,	f℥ij.
Syrup. aurantii,	f℥iss.

M. Sig.: A teaspoonful or two every three or four hours.

In uræmic accidents and puerperal eclampsia, the hypodermatic injection of pilocarpine is of marked benefit. The fulgurant pains of locomotor ataxia may sometimes be relieved by this method, and in septicæmia it has materially modified the symptoms, even when failing to prevent death. In some instances it has proved successful in hydrophobia. A hypodermatic injection of pilocarpine may arrest an attack of asthma, and should be given a trial in acute pulmonary œdema. A cold may be broken up by small doses of pilocarpine followed by quinine. A dose of pilocarpine will generally succeed in averting a malarial chill.

PIMENTA (U. S. P.).—**Allspice.**
Dose, gr. x–xl.

Preparation.

Oleum Pimentæ (U. S. P.).—Oil of Pimenta. *Dose,* ♏iii–v.

Pharmacology.—The nearly ripe fruit of Eugenia pimenta (Myrtaceæ), of Tropical America, is an aromatic stimulant, mainly used as a spice to promote appetite and digestion. It contains a volatile oil, which is also officinal (3 to 4 per cent.), some fixed oil, resin, tannin, gum, etc. A fluid extract is also made, but is not officinal (dose, ♏viii–xl), and an aromatic water.

Physiological Action and Therapy.—Allspice is a pungent, aromatic stimulant, acting as a carminative, and stimulating the secretions of the mouth and stomach. It may be used to disguise the taste of unpalatable drugs, and is one of the ingredients of spice plasters. The oil can be added to pill-masses to prevent the griping of purgatives.

PIMPINELLA.—Pimpernel.

Dose, ♏ xv–xxx.

Pharmacology.—The root of Pimpinella saxifraga (Umbelliferæ), growing in Europe, contains a golden-yellow volatile oil with an odor resembling that of parsley-seed, some acrid resin, and benzoic acid.

Physiological Action.—It exerts decided effects over mucous membranes, and is diuretic and expectorant.

Therapy.—Used in catarrh of various parts of the body, including gastric catarrh and bronchorrhœa. It is best given as fluid extract.

PINUS CANADENSIS.—Hemlock Spruce.

Pharmacology.—The bark of Abies Canadensis (Coniferæ) of North America is very astringent, containing large quantities of tannin and some volatile oil.

Therapy.—In the form of a dilute, alcoholic fluid extract it is a convenient agent to be employed where the effects of tannin are desired. It is used principally as a local astringent in pharyngitis, tonsillitis, uterine catarrh, and hæmorrhoids, applied in full strength; or it may be used diluted as a wash in leucorrhœa or gleet. This drug may be employed in diarrhœa of adults, although in such cases the prescription had better be written at once for tannic acid in the desired quantity.

Caution.—A white extract of Pinus Canadensis is believed to contain a certain proportion of zinc chloride, and should therefore not be taken internally, although it is useful as an external application or wash. It rapidly relieves the pain of a burn, when applied in full strength, according to Dr. Wm. C. Wile.

PIPER (U. S. P.)—**Pepper, Black Pepper.**

Dose, gr. ii–xv.

Preparations.

Oleoresina Piperis (U. S. P.).—Oleoresin of Pepper. *Dose,* ♏ ¼–j.

Piperina (U. S. P.).—Piperine (a proximate principle of feebly alkaloidal power prepared from pepper, and occurring also in other plants of the same natural order). *Dose,* gr. ss–x.

Pharmacology.—Pepper is the unripe fruit of Piper nigrum (Piperaceæ) of India and neighboring islands. The berries are small, pungent, and spicy to the taste, and of aromatic odor; they contain **Piperine,** volatile oil, pungent resin, fatty matter, etc. The oleoresin, extracted

by ether, contains the volatile oil and acrid resin, with a little piperine. The piperine is in pale-yellow prisms, and may be contaminated with some of the volatile oil.

Physiological Action.—Pepper is an irritant externally and internally. Owing to its pleasant pungency it is largely used as a condiment at the table. It is decidedly stimulating to the digestive organs and to the circulation, and also to the kidneys, but to a less degree, as it passes out of the body by the urine. Pepper likewise promotes the action of the skin. If taken in excessive quantities its local action is sufficiently powerful to excite inflammation of the gastro-intestinal mucous membrane, and cases are on record in which pepper has produced delirium, rigors, and convulsions.

Therapy.—In flatulent dyspepsia and feeble digestion pepper may be advantageously taken with the food. It is an ingredient of the Asiatic pill, which has been used in hæmorrhoids with decided benefit.

℞ Acid. arseniosi, ... gr. iij.
Piperis, ... ℥ss.
M. et ft. pil. no. lx.
Sig.: A pill after meals for indigestion and hæmorrhoids.

Lozenges containing pepper have also been successfully employed for the relief of hæmorrhoids, ulcers of the rectum, and fissures of the anus. Dr. Whitla suggests that cubeb be added, and the balsam of copaiba be substituted for the inert honey which enters into the formula of the British confection of pepper. He also recommends the following preparation in atonic condition of the lower bowel:—

℞ Pulv. piperis nigr.,
Pulv. carui,
Pulv. cubebæ, ... āā ℥ss.
Mel despumatæ, ... q. s.
Ft. electuarium.
Sig.: A teaspoonful three times a day.

Pepper is largely used in domestic medicine in the form of a gargle for sore throat, and is not without effect in relaxed uvula. It has also been made into an ointment, and applied with success to tinea capitis. The alkaloid has some antiperiodic powers, and is a good addition to a pill for chronic malaria.

PISCIDIA ERYTHRINA.—Jamaica Dogwood.

Preparations.

Extractum Piscidiæ.—Extract of Jamaica Dogwood. *Dose*, gr. ii–x.
Pulvis Extracti Piscidiæ.—Powdered Extract of Jamaica Dogwood. *Dose*, gr. ii–x.
Pilula Piscidiæ.—(Made from the extract.) *Dose*, gr. ij.
Extractum Piscidiæ Fluidum.—Fluid Extract of Jamaica Dogwood. *Dose*, f℥ss–ij.

Pharmacology.—The bark of the root of Piscidia erythrina (Leguminosæ), a tree of the West Indies, growing to the height of 20 feet, has a heavy, narcotic odor, recalling that of opium, and has a bitterish, acrid taste. It contains **Piscidin,** a yellowish, crystallizable, resinoid substance, insoluble in water, but soluble in alcohol, besides other resinous substances, oil, tannin, etc., but it has not yet been determined to which of these the physiological effects are attributable.

Physiological Action.—According to the experiments of Dr. Isaac Ott, Jamaica dogwood is narcotic to frogs, animals and men. It enhances the secretion of the skin, reduces the frequency of the pulse, raises arterial tension by stimulating the vasomotor centre, the increase being soon followed by a fall due to a weakening of the heart. It causes a tetanoid state by a stimulant action upon the spinal cord. Jamaica dogwood likewise causes dilatation of the pupil, followed by contraction, as asphyxia develops. It causes death by either heart-failure or, what is more frequent, by arresting respiration. Pitcher has observed several cases in which alarming symptoms supervened from 8-drop doses every three hours. Jamaica dogwood, used medicinally in suitable doses, will not diminish the appetite or cause constipation. It is seldom followed by nausea, headache, or other unpleasant effect.

Therapy.—Jamaica dogwood, in hæmorrhoids, has been successfully used locally in conjunction with the acetate of lead. A cloth saturated with the fluid extract has been found efficient in superficial burns and scalds. Flagg states that the fluid extract of Jamaica dogwood has been found to possess decided value as a local and systemic analgesic. In general practice this combination of effect is frequently desirable, and in dental practice it will be recognized as especially valuable in treatment of periodontitis, alveolar abscess, pulp irritation, and other painful conditions within the oral cavity, as topical applications, with directions to swallow the saliva, promptly induce relief. Flagg also recommends 5 to 10 drops of the fluid extract given at the same time, in the diseases named, every hour or so as required.

Internally, Jamaica dogwood allays pain, relaxes spasm, quiets reflex excitability, and promotes sleep. It is consequently well adapted to act as a substitute for opium, especially when, as is not infrequently the case, the latter drug is not well borne. In the various forms of neuralgia, including sciatica, Jamaica dogwood has proved of value. Gastro-enteralgia, consequent to typhoid fever, has been also notably relieved by it. In the lancinating pains of locomotor ataxia it has, however, proved inefficient. In pelvic neuralgia, the pain produced by fibroma of the uterus, and in dysmenorrhœa, piscidia has been found of much service. This remedy is likewise able to quell the pains of false labor

and of threatened abortion, in which, and in dysmenorrhœa, it is well combined with viburnum prunifolium, as:—

℞ Extract. piscidiæ fl.,
Extract. viburni prunifol. fl.,
Syrupi aurantii, ... āā f℥j.
M. Sig.: A teaspoonful, to be repeated every hour or two.

The pain due to a fractured bone may be ameliorated by administrations of this agent, which is also beneficial in acute or chronic rheumatism. The pains of inflammation may likewise be ameliorated by Jamaica dogwood. In panophthalmitis, iritis, irido-cyclitis, and in acute abscess of the auditory meatus, it is also capable of relieving the suffering. The pain of carcinoma has been assuaged by this remedy, which may here not infrequently replace opium with advantage. On account of its antispasmodic virtues it is of considerable service in alleviating the paroxysms of asthma and whooping-cough. It is also beneficial to coughs of reflex origin, of bronchitis and of pulmonary tuberculosis. Hysterical convulsions have yielded to the influence of this drug. Piscidia quiets restlessness and delirium, and induces sleep in delirium tremens, or mania a potu, and has been employed with gratifying success in the insomnia of insane patients. In insomnia, however caused, this agent fulfills an excellent service. Uterine colic and cholera morbus likewise prove amenable to its action.

PIX BURGUNDICA (U. S. P.).—Burgundy Pitch.

Preparations.

Emplastrum Picis Burgundicæ (U. S. P.).—Burgundy-Pitch Plaster (Burgundy pitch, 9 parts; yellow wax, 1 part).

Emplastrum Picis Cum Cantharide (U. S. P.).—Warming Plaster (cerate of cantharides, 1 ounce; Burgundy pitch, 11½ ounces).

Pharmacology and Therapy.—Burgundy pitch is the prepared, resinous exudation of Abies excelsa (Coniferæ), a tree of Southern Europe. It is a resin with traces of volatile oil. It has some balsamic properties, and is slightly irritating to the skin. In exceptional instances its local action is severe, and it gives rise to vesicles and pustules, or even produces ulceration. The officinal plasters are mild counter-irritants. The warming plaster is useful in chronic rheumatic swellings and in affections of the chest. Burgundy pitch has been thought to have some special action upon the rectum, and for this reason has been given in hæmorrhoids, made into a pill with tar. Burgundy pitch also enters into plasters of galbanum, of iron, and of opium.

PIX CANADENSIS (U. S. P.).—**Canada or Hemlock Pitch.**

Preparation.

Emplastrum Picis Canadensis (U. S. P.).—Hemlock Plaster (Canada pitch, 9 parts; yellow wax, 1 part).

Pharmacology.—The prepared resinous exudation of Abies Canadensis (Coniferæ) contains resin and a trace of volatile oil. The uses are similar to the preceding. (For Hemlock-Spruce Bark, see page 821.)

PIX LIQUIDA (U. S. P.).—**Tar.**

Preparations.

Syrupus Picis Liquidæ (U. S. P.).—Syrup of Tar (6 per cent.). *Dose*, f℥i–ij.
Unguentum Picis Liquidæ (U. S. P.).—Tar Ointment (tar and suet, equal parts).
Vinum Picis (N. F.).—Wine of Tar (a saturated solution in sherry wine). *Dose*, f℥i–iv.

Pharmacology.—Tar is an empyreumatic oleoresin, obtained by the destructive distillation of the wood of Pinus palustris and other species of pinus (Coniferæ) of Europe and America; that coming from North Carolina and Sweden is the best. It should be free from mechanical impurities. It contains oil of turpentine, pyrocatechin, acetic acid, acetone, methylic acid, xylol, creasote, phenol, etc., and is blackened by wood-smoke. Tar is soluble in less than its own bulk of alcohol or chloroform, is slightly soluble in olive-oil or oil of turpentine. By distillation it yields an acid liquor called pyroligneous acid, and an empyreumatic oil, called oil of tar, which is officinal. What is left behind is **Pitch**, which is a black solid, presenting a shining, fractured surface, melts in boiling water, and consists of resin with various empyreumatic resinous products, which have collectively received the name of **Pyretin.** The creasote of tar is of special interest on account of its antiseptic and preservative properties, from whence it derived its name. The creasote of beech-wood is used largely in medicine. (See page 579.)

Lysol, a new tar combination, is derived, according to Gerlach, from tar-oils by boiling with alkalies and fats. It possesses the consistency of soft, or potash, soap, and is readily soluble in water.

Physiological Action.—Tar is an irritant, and is liable to produce a papular eruption upon the skin if applied too freely; it is also absorbed readily, so that when a large surface is exposed to its action, feverish symptoms, blackish urine, and symptoms of carbolic-acid poisoning may ensue. The stools become blackish, and, as well as the urine, possess the odor of tar. Epigastric pain, vomiting, severe headache, or a sense of oppression in the head may also occur. Tar has an astringent effect upon mucous membranes. It has decided antiseptic power. When tar is taken internally, small doses exert a stimulating effect upon the

circulation and secretory apparatus. Large, or too long continued, doses destroy appetite and impair digestion, depress the action of the heart, and cause nervous exhaustion.

Therapy.—Tar is a good application to scaly skin diseases, such as psoriasis, but the officinal ointment is liable to cause irritation and should be diluted when used:—

℞ Ung. picis, ... ʒij.
Ung. zinci oxidi, ... ʒvj.
M. For the relief of itching in chronic eczema.

Tar ointment has been used with success in scabies and tinea. It is necessary, always, to be careful in applying tar, as it may excite dermatitis or an acne-like eruption which Hebra called "tar-acne." Tar ointment is of value in prurigo, and is sometimes capable of lessening this notoriously rebellious affection. Pruritus ani is often allayed by a weakened tar ointment. The same preparation, either in full strength or modified, is serviceable in lichen, comedo, sycosis, pemphigus, lupus erythematosus and vulgaris. An alkaline tar-water, made by adding tar fʒij, caustic potash ʒj, to water f℥v, is a useful agent in the treatment of eczema. Lysol, the tar combination, is said by Gerlach to be a good disinfectant and antiseptic. He advises lysol to be employed, in from ½- to 1- per-cent. solution, whenever an antiseptic or aseptic operation is desired.

Pix solida, or pitch, is used externally in plasters. It is entirely different from the residue of coal-tar or "gas-pitch."

A tar-water (made by mixing 1 part with 4 parts of water) was formerly officinal. It is a sherry-colored, slightly-acid liquid, having a strong odor of tar. It may be used with an atomizer or vaporized by heat in chronic catarrhal disorders of the air-passages. Ringer and Murrell have demonstrated the usefulness of tar in winter cough, and have ascertained that it materially lessens the tendency to taking cold. Dr. Phillips finds it of service in chronic pulmonary tuberculosis; it improves appetite and digestion, checks diarrhœa, and quiets cough. A tar-water made with tar and lime-water, and percolated through powdered wild-cherry bark, is highly esteemed by H. C. Wood in chronic diarrhœa. The tar-water spray is beneficial in pharyngitis and laryngitis. It is also an efficient antiseptic application to unhealthy wounds or ulcers. Tar is likewise taken internally for the same class of diseases for which terebinthinate preparations are usually prescribed. Pills containing 1 or 2 grains are useful in winter cough and other bronchial disorders. In many chronic skin disorders the internal administration of tar is a valuable adjunct to local treatment. McCall Anderson speaks favorably of the action of small doses of tar, taken internally, in both psoriasis and chronic eczema.

PLANTAGO.—Plantain.

Pharmacology and Therapy.—The leaves of plantain (Plantago major and lanceolata, N. O. Plantaginaceæ) are used as a vulnerary, the fresh leaves being pounded in a mortar into a paste and applied to wounds to check bleeding. In rhus poisoning, burns, scalds, bruises, and even erysipelas, it is said to be extremely efficient. An infusion may be administered internally, or a fluid extract may be given in doses of ♏v–f℥j. It does not appear in Prof. Laurence Johnson's "Medical Botany of the United States," and probably has very little therapeutic merit.

PLUMBUM.—Lead.

Salts and Preparations.

Plumbi Oxidum (U. S. P.).—Oxide of Lead, Litharge.
Emplastrum Plumbi (U. S. P.).—Lead Plaster, Diachylon.
Unguentum Diachylon (U. S. P.).—Diachylon Ointment. (See page 831.)
Liquor Plumbi Subacetatis (U. S. P.).—Solution of Lead Subacetate, Goulard's Extract.
Liquor Plumbi Subacetatis Dilutus (U. S. P.).—Dilute Solution (3 per cent.).
Ceratum Plumbi Subacetatis (U. S. P.).—Goulard's Cerate (20 of Goulard's Extract to 80 parts of camphor cerate).
Linimentum Plumbi Subacetatis (U. S. P.).—Liniment of Subacetate of Lead (40 to cottonseed-oil 60 parts).
Plumbi Acetas (U. S. P.).—Acetate of Lead, Sugar of Lead. *Dose*, gr. i–iv.
Plumbi Carbonas (U. S. P.).—Carbonate of Lead.
Unguentum Plumbi Carbonatis (U. S. P.).—Ointment of Lead Carbonate (10 per cent.).
Plumbi Iodidum (U. S. P.).—Iodide of Lead. *Dose*, gr. $\frac{1}{12}$–$\frac{1}{4}$.
Unguentum Plumbi Iodidi (U. S. P.).—Ointment of Iodide of Lead (10 per cent.).
Plumbi Nitras (U. S. P.).—Nitrate of Lead. Used as a disinfectant. Ledoyen's solution is a solution in water, ʒj to f℥j.
Plumbi Oxidum Rubrum.—Red Lead.
Plumbi Chromas.—Chromate of Lead, Yellow Pigment.

Pharmacology.—Metallic lead is readily affected by the oxygen of the air or by carbonic acid of water, and, although not poisonous itself, its salts are all deleterious, even in small amounts. Lead is therefore not a suitable lining for a reservoir for drinking-water, and lead pipes should not be used for conveying water for household purposes unless lined with tin. White lead and red lead are largely used both by painters and plumbers, who are liable to be affected owing to absorption through the skin. The chromate of lead is a yellow pigment used as a protective applied to the covers of hams, and is also sometimes fraudulently used by bakers to color cake, in order to make up for a deficiency of eggs The acetate of lead is astringent and sweetish, and has been swallowed by mistake for other drugs, such as sulphate of magnesium. Fortunately, it is irritant to the stomach and acts as an emetic, but, if retained long enough to be absorbed, coma or paralysis may ensue. Sugar of lead

has also been used in clarifying cider; and earthen vessels are glazed with a flux containing lead, so that the sources of lead poisoning are numerous. A case of lead poisoning in a young infant has been reported, caused by the mother's cleaning out the nursing-bottle with lead shot. Poisoning has also occurred from the use of cosmetics and hair-dyes containing lead. Lead is sometimes present in flour by reason of the mill-stones, by which the grain was ground, having been repaired by filling their cracks with lead. Numerous cases of lead poisoning have thus originated.

Symptoms and Treatment of Lead Poisoning.—Acute lead poisoning following a single large dose of one of the salts of lead is very rare; but acute attacks as the result of slow absorption of the drug are very common. The most striking symptoms are obstinate constipation with cramps ("dry gripes"), loss of appetite, nausea, and vomiting of white, curd-like material, the color being due to the formation of chloride of lead with the hydrochloric acid of the gastric juice. If the bowels open, the passages are of a blackish hue from the presence of sulphide of lead. Vertigo or headache may occur, and neuralgic attacks; even stupor and convulsions. Upon examination of the mouth, a **blue line** will be found in the gums near their margin, over the incisor teeth, caused by a deposit of the metal, or its sulphide, in the tissues. This line is particularly noticeable in those who neglect the care of their teeth. Various forms of paralysis may occur, the most common being "wrist-drop," or extensor paralysis of the muscles of the forearm. A fatal case of lead poisoning has lately been reported* by Dr. G. L. Walton, in which ataxia was the prominent symptom. Three similar cases have been published by Dr. J. J. Putnam. Among the symptoms attending **plumbism,** or Saturnism, are an offensive odor of the breath, pallor, emaciation, muscular pains, and loss of power. Plumbism is a frequent cause of abortion. The wives of workmen in lead factories frequently abort, even when they are not directly exposed to the influence of the metal. According to the investigations of M. Paul of 50 children born alive, nearly all died within a few years after birth and only 14 reached the age of 10 years. Amaurosis, atrophy of the optic nerve, and a train of nervous phenomena dependent upon alterations occurring in the brain (lead encephalopathy) appear from the influence of lead. A valuable memoir on the subject of cerebral symptoms due to lead intoxication has been published by Dr. Westphal.† Four forms have long been recognized under which the effects of the metal upon the brain are manifested,—the delirious, comatose, convulsive, and composite. The last named is by far the commonest, and in

* Boston Medical and Surgical Journal, October 30, 1890.

† See summary of his paper in the Medical Bulletin, August, 1889, p. 251, from Deutsche Medizinal Zeitung, May 9, 1889.

:t the characters of the other three varieties appear to be united. Apoplectic and chorea-like forms have likewise been observed. Progressive paralysis, paresis of the laryngeal muscles, and a peculiar variety which runs a typhoid course have been described by different writers. From a careful study of 13 cases, Westphal divided them into those which present general cerebral symptoms and those showing symptoms due to pressure. The first group were characterized by depressed spirits, dementia associated with melancholia, hypochondriasis, irritability, headache, and vertigo. Convulsions were very common, at times general, and again limited to certain groups of muscles. In 5 cases the spasms assumed a genuine epileptic character. Among pressure symptoms, the most frequent was paresis in districts supplied by certain cranial nerves. Disturbances of smell and vision, circulation and respiration, hemianæsthesia, and hemiparesis were observed. The author finally enumerates four modes in which lead acts upon the central nervous system: (1) by direct influence upon the brain, producing neuroses of various kinds, disturbances of intellection, and symptoms due to structural change; (2) by influence upon the blood-vessels, leading to hæmorrhage and softening; (3) by influence upon the kidneys, resulting in the cerebral symptoms of anæmia; (4) by a combination of the preceding methods.

The post-mortem examination reveals chronic catarrh of the gastro-intestinal tract, thickening of the walls of the smaller arteries, interstitial inflammation of the kidneys, with the deposit of lead in the nerve-centres, and, in fact, in every part of the body. The lead, according to the experimental researches of Prevost and Binet, accumulates especially in the kidney. The longer the course of poisoning, the more lead is contained in the kidneys. The metal may be found in these organs long after the administration of the poison has ceased. The bones also were rich in lead, which was stored up in the form of a phosphate. The principal cerebral lesions of lead encephalopathy are atrophy of certain regions, hæmorrhagic depots, apoplectic cysts, and, above all, alterations in the cerebral vessels, such as endo- and peri- arteritis, atheroma, and hyaline degeneration. Chronic plumbic intoxication is very apt to lay the foundation of kidney disease.

Physiological Action.—Given in medicinal doses, lead salts are sedative, astringent, and hæmostatic. They enter the blood, slow the heart and respiration, interfere with the nutritive functions of the red blood-corpuscles, and lead to their destruction, thus causing anæmia. Lead escapes from the blood by the skin, the liver, the kidneys, and intestinal tract. It is also found in the lacteal secretion. The excretion of uric acid is reduced, and thus lead favors the occurrence of gouty attacks in those predisposed. Persons working among white lead may escape lead

poisoning by using sulphuric-acid lemonade and fatty articles of food, and by frequent bathing. Sulphuric acid forms an insoluble compound with lead. In lead colic we may give 20 to 40 grains of sulphate of magnesium with $\frac{1}{6}$ to $\frac{1}{4}$ grain of morphine, with syrup of ginger, and water enough to make a tablespoonful every hour or two to relieve pain and constipation. Belladonna, or atropine, has also been found efficient in relieving the pain, while Bardenhewer recommends pilocarpine as rapidly accomplishing the same purpose. Alum is of value in the treatment of chronic lead poisoning. Where the lead is in the tissues, it may be slowly removed by the administration of small doses of potassium iodide, and by vapor baths or Turkish baths, keeping up also the action of the kidneys.

Therapy.—Lead is used locally in the form of metallic plates in the treatment of leg-ulcers, with good effect, to repress exuberant granulations. Nitrate of lead is employed in onychia with good result. As Goulard's solution, or cerate, it is applied to erysipelas, acute eczema, contusions, and inflammations of various kinds, but should be diluted. The early application of Goulard's solution is occasionally able to abort a felon. This liquid will often relieve itching, and is therefore of avail in paræsthesia and urticaria. Lead-water with laudanum was formerly much used to relieve pain and inflammation:—

℞ Liq. plumbi subacetatis, ... f℥j.
Tr. opii, ... f℥ij.
Aquæ destillatæ, ... f℥v.
M. For external use.

The acetate of lead is used for the same purpose, and also as an injection for gonorrhœa or leucorrhœa:—

℞ Plumbi acetatis, ... gr. xij.
Zinci sulphatis, ... gr. viij.
Aquæ rosæ, ... f℥iij.
M. Sig.: Use as an injection every six hours for gonorrhœa or gleet.

℞ Plumbi acetatis, ... gr. x.
Glycerini, ... f℥ss.
Aq. hamamelidis dest., ... f℥j.
Aquæ dest., ... f℥iss.
M. Sig.: For injection.

℞ Plumbi acetatis, ... gr. viij.
Acidi carbolici, ... ♏ij.
Glycerini, ... f℥ss.
Aquæ rosæ, ... f℥iiiss.
M. Sig.: For injection.

In many acute and chronic diseases of the skin the various lead salts are most useful on account of their soothing and astringent action. The following formulæ are suggested:—

℞ Plumbi acetatis,	gr. x vel xx.
Morphinæ sulphatis,	gr. v.
Mentholi,	gr. x.
Creasoti,	♏x.
Pulveris marantæ,	ʒj.
Ungt. zinci oxidi,	℥j.

M. For subacute and chronic eczema.

℞ Plumbi carbonatis,	℥ss.
Creasoti,	♏x.
Ol. olivæ q. s. ft. ungt. mollis.	

M. Useful in erysipelas, burns, and in bruises, especially when the skin assumes a blue or dark tinge.

℞ Plumbi carbonatis,	ʒij.
Zinci carbonatis,	℥ss.
Ol. eucalypti,	♏v.

M. A serviceable dusting-powder in acute eczema, herpes, and seborrhœa.

In conjunctivitis, dilute lead-water was formerly much used, but if ulceration of the cornea exist it may cause a permanent white patch. In diarrhœa and sporadic cholera, acetate of lead and opium pills are of great service; and the acetate, in doses of gr. ss–iij, is valuable in internal hæmorrhage or hæmoptysis.

Special Forms.—The glycerin of the subacetate of lead of the British Pharmacopœia is a good application to eczema. It corresponds in strength to Goulard's solution, but has glycerin as the menstruum. The liniment of the subacetate is a good astringent application to inflamed skin, chapped hands, and bruises. White-lead paint (without turpentine) is a good application to a burn or scald where the skin is unbroken. The ointment of the iodide of lead is used as a resolvent on glandular swellings, scrofulous tumors, goitre, etc., and also as an application in acne and other skin diseases. The nitrate of lead, in dilute solution, is useful in ozæna as a wash, also in leucorrhœa, and to correct the fetid odor of discharges from ulcers, etc. Fissures of the nipples are cured by applications of a 2-per-cent. solution in glycerin. The oleate of lead, melted with an equal amount of lard-oil, is a useful application in eczema, acne, etc. (See page 383.) Lead plaster is employed by surgeons to protect parts of the body exposed to chafing by splints or apparatus; it is also good to prevent bed-sores and as a base for other plasters. Hebra's diachylon ointment* is made by melting equal parts, by weight, of lead plaster and linseed-oil, to which a proportion of

* An improved process for making Hebra's diachylon ointment is given by Deringer: Dissolve acetate of lead 200 grammes in 1 litre of distilled water and mix with 300 grammes of white castile-soap previously dissolved in 1½ litres of warm, distilled water. Filter both solutions before mixing. The precipitate is then washed with water, freed as much as possible from water by kneading, and 1 part is melted with 1½ parts of olive-oil on the warm bath. The mixture is then triturated in a mortar until it forms a fine, white salve.—Proceedings Am. Pharm. Association, 1881, p. 63.

balsam of Peru and a little oil of lavender are sometimes added. Diachylon ointment is serviceable in hyperidrosis. It should be spread upon pieces of linen large enough to cover the foot and separate pieces placed between the toes. The foot is then covered with linen and bandaged, and this procedure is repeated every day for one or two weeks This ointment often proves an excellent application also in subacute and acute eczema. In seborrhœa, dermatitis, herpes zoster, and sycosis, the use of lead ointment is attended with good results.

In the treatment of the muscular weakness or paralysis following the absorption of lead, besides the iodide of potassium and occasional purges of sulphate of magnesium, with hot baths, etc., it is necessary to employ galvanism, to keep up the nutrition of the muscles and prevent fatty degeneration, and to employ systematic exercise, with massage. Semmola and others have published the details of a method by which the continuous current was successfully employed according to a systemic—as opposed to local—method, the poles being applied to the tongue and pit of the stomach. The sole reliance was placed upon galvanism, and no iodide of potassium was employed. The blue line upon the gums disappeared at the end of about three weeks, and at the same time the muscles began to be capable of feeble movements. The method proved of no avail when cerebral symptoms were present.

The acetate of lead fulfills a double purpose in the treatment of gastric ulcer. It checks hæmorrhage and at the same time promotes cicatrization. In the diarrhœa of typhoid fever and phthisis, this salt is an excellent remedy, and can be prescribed with service thus in ordinary diarrhœa, as well as in that from phthisis :—

℞ Plumbi acetatis,
Pulv. ipecacuanhæ et opii, ... āā gr. xxiv.
M. et ft. chartæ no. xij.
Sig.: A powder every hour or two.

℞ Plumbi acetatis, ... ʒj.
Tinct. opii, ... f ʒij.
Tinct. catechu, ... f ℥j.
Syr. zingiberis, ... q. s. ad f ℥iij.
M. Sig.: One to two teaspoonfuls in water every hour or two for diarrhœa. The dose for a child from two to six years old, from ten to thirty drops.

The acetate possesses some power, likewise, over the night-sweats of pulmonary disease. It is of service in chronic gastric catarrh and diminishes the copious secretion of chronic bronchitis. Asthma associated with chronic bronchitis and the catarrhal stage of pertussis are relieved by the same preparation. The acetate of lead has been found beneficial in dysentery, given either by the mouth or in the form of suppositories, as follows :—

℞ Plumbi acetatis,
Camphoræ, ... āā ʒss.
Extracti opii, ... gr. iiss.
Ol. theobromæ, ... q. s.
M. et ft. suppositoriæ no. x.

Sig.: Insert one into the bowel every hour or two for severe diarrhœa and dysentery, especially when attended with tenesmus.

The acetate of lead is useful in hypertrophy of the heart on account of its power of retarding the action of that organ. From its influence upon the heart and its astringency, it is sometimes employed in the treatment of internal aneurism. Trocy advocates its use in pneumonia, especially when that disease attacks drunkards or persons of depressed vitality. He claims that the temperature and rate of respiration are lowered, and the disease is prevented from passing into a chronic form.

PODOPHYLLUM (U. S. P.).—**Podophyllum, May-Apple, Mandrake.**

Preparations.

Abstractum Podophylli (U. S. P.).—Abstract of Podophyllum. *Dose*, gr. ii–v.

Extractum Podophylli (U. S. P.).—Extract of Podophyllum. *Dose*, gr. ii–iv.

Extractum Podophylli Fluidum (U. S. P.).—Fluid Extract of Podophyllum. *Dose*, ♏ xxx.

Resina Podophylli (U. S. P.).—Resin of Podophyllum. *Dose*, gr. $\frac{1}{8}$–j.

Podophyllotoxin. Dose, gr. $\frac{1}{16}$–$\frac{1}{6}$.

Pharmacology.—The rhizome and rootlets of Podophyllum peltatum (Berberidaceæ), growing in United States and Canada, possess valuable medicinal properties. This plant contains about 4 per cent. of resin, which is a mixture of **Picropodophyllin, Podophyllinic** and **Pyrocatechuic acids, Podophylloquercitin** (the coloring principle), with **Saponin, gum, starch,** gallic acid, fixed oil, salts, etc. It contains no alkaloidal principle. According to Podwissotzky, the active principle is a neutral crystalline body, picropodophyllin, which exists in combination with an inactive resin-acid called picropodophyllic acid, and the resulting combination he named **Podophyllotoxin**; it is a bitter, white, resinous powder, soluble in weak alcohol and in hot water, but is precipitated from alcoholic solution by cold water in excess. The officinal resin of podophyllum consists of two resins, one soluble both in ether and in alcohol, the other only in alcohol. The former, comprising from 75 to 80 per cent., is the active part, the other being without any effect, according to Cadbury. The resin is very irritant to the eyes, and when handled the dust is apt to cause conjunctivitis. The resin of podophyllum is insoluble in benzol, like that of jalap and scammony, but differs from these in being soluble in alkaline solutions, from which it may be precipitated by acids.

Physiological Action.—Podophyllum is a slow cathartic, acting upon the liver and the intestinal glands. It also exerts its purgative effects

when introduced into the blood; also by absorption, when applied to a raw surface. In small doses it is laxative, in large doses drastic, and may cause gastro-enteritis. Podophyllotoxin has lately been isolated in a pure, crystalline form, and Neuberger has made an experimental study of its physiological action. Upon frogs and rabbits it has but little effect. Cats, however, proved extremely sensitive to its influence. Severe vomiting and diarrhœa occurred in a few hours after its administration. As death approached the animal became apathetic and paretic, and the temperature fell. Similar effects were produced in dogs. After death there was found great irritation, or even abscess, at the point of injection. The mucous membrane and adenoid tissue of the intestines were congested or inflamed; the liver and kidneys were swollen. Neuberger, therefore, concludes that the substance acts simply as an irritant, exciting catharsis in its elimination by the intestinal glands.

Therapy.—On account of the smallness of the dose and slight taste of podophyllotoxin, or the resin, it is very applicable to the treatment of constipation of young children, or the opposite condition of diarrhœa from want of proper secretion. A grain may be dissolved in spirit of ginger, and a drop or two given on sugar. It will also be found useful in adults, administered in the same manner, to check vomiting. In chronic constipation the following formulæ may be used:—

℞ Podophyllotoxini,
Aloini,
Extracti belladonnæ alc.,
Abstracti ignatiæ, ... āā gr. ij.
Extracti taraxaci, ... gr. xl.
M. et ft. pil. no. xx.
Sig.: A pill three times a day.

Bouchut* recommends in infantile constipation this syrup:—

℞ Resinæ podophylli, ... gr. ¾.
Alcoholis, ... gr. lxxv.
Syr. althææ, ... f℥iij.
M. Sig.: A dessertspoonful daily.

It is also useful in malarial liver disorders and jaundice, and in dyspepsia dependent upon deficient secretion of the liver and intestinal glands. In that form of sick headache associated with loose and dark-colored stools, podophyllum generally affords relief.

POLYGONATI RADIX.—Root of Solomon's Seal.

Dose, gr. xv–xxx, in fluid extract.

Pharmacology.—The Polygonatum giganteum and P. biflorum (Liliaceæ), common plants in the Eastern United States, have peculiar, boot-

* L'Union Médicale, August 5, 1890, p. 180.

shaped rhizomes, bearing the scars of preceding leaf and flower-stalks, which look like the impress of a seal. They contain a bitter, acrid principle, **Convallarin,** with other vegetable constituents, such as tannin, mucilage, etc.

Physiological Action.—Slightly tonic, astringent, and alterative.

Therapy.—Used externally, in decoction or fluid extract, as an application to freckles, and for relieving bruises, sprains, and local inflammations; also as an injection for leucorrhœa, menorrhagia, and as a wash for hæmorrhoids. Internally, it has been used in rheumatism, gout, and dropsy. It is claimed to have special effects upon relaxed mucous membranes.

POLYGONUM.—Water-Pepper, Smart-Weed.

Dose, ♏x–ʒj, in fluid extract.

Pharmacology.—The smart-weed, Polygonum hydropiperoides (Polygonaceæ), is a small, indigenous herb, with narrow, green leaves and spikes of small, greenish or white flowers. It contains **Polygonic acid,** an acrid principle insoluble in water, with tannin, etc. The active principle is dissipated by heat, and therefore an alcoholic tincture of the fresh plant is the best form, or a well made fluid extract. The dose of the fluid extract is from ♏x to fʒj. A solid extract has also been prepared, the dose of which is from 1 to 5 grains.

Physiological Action.—Polygonum has a burning, acrid taste; inflames the skin when rubbed upon it, and internally has stimulating effects, especially to the ovarian functions and to the kidneys.

Therapy.—Employed in domestic practice, externally as counter-irritant and internally as an emmenagogue, ½-drachm doses of the fluid extract being administered for several days before the expected period, in amenorrhœa. Water-pepper is likewise of service in functional impotence. On account of its diuretic virtue it has been employed for the purpose of washing out sand or gravel from the kidney or bladder. It has also been used in diarrhœa, bronchitis, and catarrhal disorders.

POPULI CORTEX.—White Poplar-Bark, American Aspen.

Dose, gr. xxx–ʒj, in fluid extract.

Pharmacology and Therapy.—The Populus tremuloides (Salicaceæ), a forest tree of the United States, contains in its bark **Populin,** a bitter principle, resembling quinine or cinchonine in its physiological and therapeutical effects. Poplar-bark has been used as a tonic and antiperiodic in doses of 30 to 75 grains several times a day in decoction or fluid extract. An extract may be obtained by evaporating the fluid extract to the pilular consistence. Dose, gr. ii–xij.

The terminal buds of the poplar have a balsamic odor, and contain

volatile oil, resin, etc., and possess the medicinal properties of terebinthinate substances. The ointment of poplar-buds (made by digesting freshly-bruised poplar-buds with twice their weight of hot lard, and gently boiling until all moisture is dissipated) is a fragrant ointment resembling benzoinated lard in antiseptic qualities.

POTASSIUM.—The metal **Kalium.**

Salts and Preparations.

Potassa (U. S. P.).—Caustic Potash, Potassium Hydrate.

Liquor Potassæ (U.S.P.).—Solution of Potash (5 per cent.). *Dose*, ♏ii–xx. Well diluted.

Potassa cum Calce (U. S. P.).—Vienna Paste (equal parts potassium hydrate and lime. Made into paste with alcohol). Escharotic.

Potassii Acetas (U. S. P.).—Acetate of Potassium. *Dose*, gr. x–ʒj.

Potassii Bichromas (U. S. P.).—Bichromate of Potassium. *Dose*, gr. 1/5.

Potassii Bitartras (U. S. P.).—Bitartrate of Potassium, Cream of Tartar. *Dose*, gr. xx–ʒiv.

Antimonii et Potassii Tartras (U. S. P.).—Tartar Emetic. gr. 1/16–j.

Ferri et Potassii Tartras (U. S. P.).—Tartrate of Iron and Potassium.

Potassii et Sodii Tartras (U. S. P.).—Tartrate of Potassium and Sodium, Rochelle Salt. *Dose*, gr. xx–ʒiv.

Potassii Tartras (U. S. P.).—Tartrate of Potassium. *Dose*, gr. v–xx.

Potassii Bromidum (U. S. P.).—Bromide of Potassium. *Dose*, gr. x–ʒj.

Potassii Carbonas (U. S. P.).—Carbonate of Potassium. *Dose*, gr. ii–xx.

Potassii Bicarbonas (U. S. P.).—Bicarbonate of Potassium. *Dose*, gr. v–xxx.

Potassa Sulphurata (U. S. P.).—Sulphurated Potassa (sometimes called sulphuret or sulphide of potassium). *Dose*, gr. ii–viij.

Potassii Sulphas (U. S. P.).—Sulphate of Potassium. *Dose*, gr. xx–ʒij.

Potassii Sulphis (U. S. P.).—Sulphite of Potassium. *Dose*, gr. v–ʒj.

Potassii Chloras (U. S. P.).—Chlorate of Potassium. *Dose*, gr. ii–x.

Trochisci Potassii Chloratis (U. S. P.).—Troches of Chlorate of Potassium (each containing gr. v of chlorate of potassium). *Dose*, one or two troches.

Potassii Citras (U. S. P.).—Citrate of Potassium. *Dose*, gr. x–xl.

Liquor Potassii Citratis (U. S. P.).—Solution of Citrate of Potassium.

(Effervescing draught is the extemporaneous solution of potassium citrate, made by mixing the equal quantities of two solutions, one containing ℥ij of citric acid to the pint, the other ℥iij bicarbonate of potassium to the pint. It contains about 9 per cent. of potassium citrate, with a little free citric and carbonic acids. *Dose*, f℥j or f℥ss of each of the solutions.)

Mistura Potassii Citratis (U. S. P.).—Mixture of Potassium Citrate (made by neutralizing fresh lemon-juice with crystals of bicarbonate of potassium. Must be freshly prepared). *Dose*, f℥ss.

Potassii Cyanidum (U. S. P.).—Cyanide of Potassium. *Dose*, gr. 1/12–j.

Potassii Ferrocyanidum (U. S. P.).—Ferrocyanide of Potassium, or Yellow Prussiate of Potash. *Dose*, gr. x.

Potassii Hypophosphis (U. S. P.).—Hypophosphite of Potassium. *Dose*, gr. ii–xxx.

Syrupus Hypophosphitum (U. S. P.).—See page 807.

Potassii Iodidum (U. S. P.).—Iodide of Potassium. *Dose*, gr. v–ʒj.

Unguentum Potassii Iodidi (U. S. P.).—Ointment of Iodide of Potassium (potass iodide 12, sodium hyposulphite 1, water 6, benzoinated lard 81 parts, or about ʒj to ℥j.

Potassii Nitras (U. S. P.).—Nitrate of Potassium, Saltpetre. *Dose*, gr. ii–xx.

Charta Potassii Nitratis (U. S. P.).—Nitre Papers (unsized papers moistened with a 25-per-cent. solution in water, and dried and cut into pieces about 8 inches square).

Argenti Nitras Dilutus (U. S. P.).—Dilute Lunar Caustic (contains 50 per cent. of nitrate of potassium).

Potassii Permanganas (U. S. P.).—Permanganate of Potassium. *Dose*, gr. ss–ij.

Liquor Potassii Arsenitis (U. S. P.).—Solution of Arsenite of Potassium. Fowler's Solution (strength nearly 1 per cent.). See page 361. *Dose*, ♏i–x.

Pulvis Effervescens Compositus (U. S. P.).—Seidlitz Powder (sodium bicarbonate 40 grains, Rochelle salt ʒij, in a paper together; tartaric acid 35 grains in a separate paper. Dissolve separately in water and mix). *Dose*, 1 or 2 taken while effervescing.

Pharmacology.—Potassium salts exist in certain minerals, but they are derived principally from the ashes of plants; they are also present in animal tissues, especially in the muscles. Potassium is a white metal discovered by Humphry Davy in 1807. It decomposes water with such violence that it ignites the hydrogen, burning with a red flame and forming the hydrate or caustic potash, which is a most powerful alkaline base, soluble in half its weight of water. When dissolved in 20 parts of water it forms liquor potassæ. The chlorate of potassium, when triturated in a mortar with sugar, sulphur, tannin, charcoal, glycerin, and numerous other substances, and occasionally even triturated alone, is liable to explode; and therefore, in making the troches, the Pharmacopœia directs that the chlorate of potassium shall be added to the other ingredients last and mixed carefully by means of a horn spatula. The troches sometimes explode spontaneously. At all events, the proportion is too large; there should not be more than 1 or 2 grains in each lozenge. The bichromate also forms an explosive mixture with glycerin. The salts of potassium are usually colorless or white and are generally soluble in water; some of them are deliquescent.

Physiological Action.—Caustic potash abstracts water and fat from the tissues and produces a soft eschar when applied to the skin, which is subsequently separated by inflammation from the uninjured parts. This substance, moreover, dissolves the albuminous constituents of parts with which it is brought into contact. Taken internally in concentrated form, it is a corrosive mineral poison, destroying the soft parts and causing much irritation and secondary inflammation of the larynx or œsophagus, leading to stricture and gastritis. Even by liquor potassæ these symptoms may be produced, unless the remedy be very largely diluted. The carbonate is a powerful antacid, both in the intestinal tract and in the blood, favoring the expulsion of uric acid, with which it forms salts more soluble than those of sodium; the bicarbonate, however, is preferable for internal administration, being more acceptable to the stomach. Under its use the urine becomes alkaline. Potassium is a cardiac poison, a muscle and nerve paralyzer through an influence upon protoplasm, and destructive to the ozonizing function of the red blood-

corpuscle. These effects are shown to a different degree by different salts, and vary with the dose. In physiological doses they increase the secretions, stimulate retrograde metamorphosis, and promote oxidation; if too long continued, they produce anæmia and wasting of the body. Small doses of the bicarbonate, taken before meals, stimulate the secretion of gastric juice and make the urine more acid; larger doses disorder digestion, are partly decomposed by the gastric juice, which is made less acid, and partly enter the blood, increasing its alkalinity and the alkalinity of the urine also. The potassium salts with vegetable acids are generally decomposed in the blood, the vegetable acid being destroyed, the base combining with carbonic acid and escaping in the urine, which it renders alkaline. The salts with mineral acids are not decomposed, but in passing through the body exercise more or less effect upon the blood and certain organs. The nitrate, in large doses, exerts a paralyzing influence upon the spinal cord, and produces great muscular weakness and reduction of reflex sensibility. In moderate doses, the nitrate raises arterial tension and slows the heart's action, but larger doses weaken its movements and finally arrest them. The fibrin of the blood is less coagulable and the red blood-corpuscles have their oxygen-carrying powers reduced. The urine is increased in quantity. Nitre-paper, in burning, gives off fumes which afford relief to asthmatic sufferers. A little compound tincture of benzoin added to the paper makes the fumes more effective and agreeable. The chlorate of potassium acts like the nitrate upon the spinal cord, but has a more profound action upon the blood, disintegrating the corpuscles and making it of a chocolate color. Taken in large doses, vomiting, with hæmatemesis, delirium, hæmatogenous jaundice, and coma result. The bodily temperature is markedly depressed by large doses of the salts of potassium, and especially by the nitrate and chlorate.

Landerer * reports a case of a man 18 years of age, who, for tonsillitis, had been given 460 grains of chlorate of potassium, to be dissolved in water and used as a gargle. He dissolved the whole in hot water and drank it in two portions within half an hour, in the evening. He subsequently was faint and extremely thirsty, and drank some beer, which produced violent vomiting through the night and pain in both hypochondria. Next morning he came to the hospital, with headache, faintness, and constipation. His skin was anæmic, eyes and lips cyanotic; he had rigors and slight jaundice. The liver was slightly enlarged; there was pain over the stomach and kidneys. The urine was very small in quantity, only about a drachm; very albuminous, and deposited a brown sediment of altered blood-corpuscles. On filtration, the color was

* British Medical Journal, December 13, 1890.

dark-cherry red. It gave the guaiac reaction and, on spectroscopic examination, the lines of methæmoglobin. Blood from the finger also showed altered blood-disks in masses, as well as unaltered blood-corpuscles, which formed imperfect *rouleaux*. Death occurred six days later, without convulsions or special anæmic symptoms. During this time suppression of urine continued. The lesions, post-mortem, were distributed through the body, but chiefly seen in the intestinal tract (which was hyperæmic, inflamed, and eroded in places) and in the kidneys (which were much enlarged, œdematous, capsule adherent, blood-vessels overfilled, the tubes plugged with brownish masses, to which some detached epithelial cells adhered). The liver and spleen were also enlarged. The symptoms appear to be primarily dependent upon excessive blood destruction, blocking up of the urinary tubules with the detritus, and the consequent nephritis and anæmia. Jaundice and cyanosis were due to the same cause. As a rational treatment, Landerer advises blood-letting, followed by transfusion. The preceding case is presented here as a typical illustration of the effects of chlorate of potassium when taken in a poisonous dose. In many cases, death occurs earlier from collapse; in others the patient becomes cyanosed and prostrated, but slowly recovers after stopping the medicine and using antidotes. It was formerly thought that the chlorate, which contains a large proportion of oxygen, was capable of yielding some of it to the tissues, but this is not now believed possible, as the salt is excreted unchanged very largely by means of the salivary glands. The nitrate, likewise, passes through the body unchanged. The treatment of poisoning will be considered in the next paragraph. The sulphate is a powerful purgative, but is too irritant to be used for this purpose, and less pleasant than Rochelle salt. The bitartrate, or cream of tartar, as it was formerly called, is diuretic as well as laxative. It is an ingredient in the compound jalap-powder, which is a very safe and efficient cathartic in dropsy attending heart or kidney disease. The salts of potassium are eliminated principally by the kidneys, though the salivary, mammary, and sudoriparous glands also assist in their removal.

Treatment of Poisoning by Potassium Salts.—Poisoning by cyanide of potassium is not very frequent, but it occasionally occurs, the symptoms and treatment being those of hydrocyanic-acid poisoning. Alkalies should be promptly administered to prevent decomposition of the salt by the acid gastric juice, and the stomach and intestinal canal emptied as soon as possible, followed by the administration of arterial stimulants, such as coffee and ammonia, with cold affusions to the spine and friction of extremities. Doses of 3 to 5 grains have proved fatal. When caustic potash has been swallowed, it is necessary to use demulcents freely, with

vinegar as a chemical antidote, and encourage vomiting, giving digitalis and stimulants hypodermatically to sustain the heart. After death there is found inflammation, with softening, erosion, and sometimes perforation of the stomach. Death may ensue from shock, cardiac paralysis, or inflammation of the stomach and intestines. The chlorate of potash causes death by depression of vital powers, due to its destructive action upon the blood and the congestive obstruction of the kidneys. The treatment is by saline purgatives and diuretics, especially calomel and caffeine, with hot baths, and, in case there is much cyanosis, transfusion of blood. The bromide of potassium causes gastralgia occasionally when taken into an empty stomach; this is relieved by hot drinks and carminatives.

Therapy.—Although an efficient escharotic, caustic potash is not often used because it produces a burn that is attended by a good deal of inflammation and pain. It was formerly the custom, in the treatment of diseases of internal organs, to establish an issue by application of caustic potash, and the resulting ulcer was kept irritated by a dried pea or a small piece of orris-root; but this practice is rarely resorted to at present. On account of the powerful, extensive, and penetrating action of this substance, it should never be used without precautionary measures being taken for the purpose of limiting its effects. A hole cut in a piece of adhesive plaster, or in several pieces overlying each other, then placed upon the skin, is a simple device by which the application of the caustic may be circumscribed. Nor should it be left long in contact with the integument, since its influence continues for some hours after it has been removed. When the integument acquires a bluish tinge, and the epiderm is softened, it is time that the remedy should be discontinued. The spot should then be washed with some weakened vinegar, in order to neutralize any alkali which might remain. Finally, a poultice is applied to the area of action. Surgeons use caustic potash in treating fistula in ano after operation, in order to prevent immediate union; also to soften ingrowing toe-nail. Dr. Pürckhauer, of Bamberg,* describes a method which he has used with entire success in the treatment of this painful affection. The portion of nail which needs to be removed is painted with a 40-per-cent. solution of caustic potash. At the end of a few seconds the upper layer of the nail has become so soft that it can be easily scraped off with a sharp-edged piece of glass. The procedure is repeated until all that remains of that portion of the nail is a thin scale, which can be excised by means of a pair of fine scissors. A valuable advantage of this practice is, that the patient is able to follow his usual avocation without the loss of any time.

It is likewise used as an application to enlarged tonsils. Caustic

* See Medical Bulletin, March, 1891.

potash is sometimes employed for the destruction of carcinomatous growths, the limitation of sloughing ulcers, or the removal of the hard, callous edges of chronic ulcers. It was formerly applied, not infrequently, to the surface of chancres, chancroids, and syphilitic ulcers, but is far too severe for such a purpose. In phagedæna, however, it may be advantageously employed; but in most cases the Vienna paste will be found a desirable substitute. The solution of permanganate of potassium (gr. v–xl in f℥j) was formerly known as Condy's fluid; it is an oxidizing disinfectant, and a useful agent in dilute solution for irrigating wounds or ulcers. A solution of this substance is a serviceable application to the throat in diphtheria and scarlet fever. The permanganate of potassium is recommended by Weir Mitchell as the best antidote to the venom of snake-bite, provided that it can be brought into direct contact with the virus before absorption. The permanganate, and caustic potash as well, have been employed with a view to neutralizing or destroying the poison of rabid animals, though the results have not been encouraging. A solution of the permanganate is an efficient deodorizer in ozæna and inflammation of the middle ear. The bicarbonate of potassium is a good lotion (ʒj–Oj) for eczema and rheumatic joints, and in stronger solution (ʒij–Oj) as an application in pruritus vulvæ, and to bites of animals or insect-stings. Leucorrhœa, dependent upon excessive functional activity of the glands of the cervix uteri, is markedly benefited by vaginal injections of weak bicarbonate-of-potassium solutions. The same solution has been used, with asserted success, injected into the bladder as a solvent of uric-acid calculi. A drachm of the cyanide of potassium dissolved in a pint of water will often allay paræsthesia.

The chlorate is also employed as a detergent wash, especially in the mouth and throat (℥j–Oj), and in mercurial salivation it is particularly useful. In weaker solutions it may be applied to unhealthy wounds, or injected into sinuses and into the bladder or rectum for local inflammation. In the form of powder it is dusted over exuberant granulations and malignant ulceration, and acts as an antiseptic and astringent. Prof. P. D. Keyser has had much success in treating small epitheliomata of the eyelids by the daily application of finely-powdered chlorate of potassium, and has thus saved a resort to the use of the knife in some cases. As troches, chlorate of potassium is dissolved slowly in the mouth, so as to constantly moisten the throat; and in this way it is very valuable in scarlatinal and diphtheritic sore throat. The bichromate of potash, in solution, is a good application to warts and corns, and to venereal excrescences or mucous patches. It is largely used with sulphuric acid as a battery fluid, and accidents occur by swallowing some of the fluid; the symptoms of irritant corrosive poisoning at once appear,

with vomiting, pain, and restlessness, requiring the use of demulcents and anodynes, and free evacuation of the stomach and bowels.

Internally, where alkalies are required, the salts of potassium have been very largely used. In acid dyspepsia, the bicarbonate, in large doses after meals, neutralizes the excess of acid and relieves heart-burn and pyrosis; while small doses, before meals, in atonic dyspepsia, stimulate the free secretion of an acid gastric juice. In some cases of gastralgia the pain may be relieved by the bicarbonate in some effervescent water. The same salt is of value in the indigestion of obese individuals, also of rheumatic and gouty subjects. It is of material assistance, moreover, in the digestion of fatty food. In diarrhœa, excited by an excessive quantity of acid in the bowel, the bicarbonate of potassium is an efficacious remedy. The carbonate, in doses of a grain or two several times a day, is a remedy of some utility in whooping-cough. In some forms of bronchitis, especially in gouty persons, the liquor potassæ is a good addition to a cough mixture, to liquefy the mucus and facilitate expectoration:—

℞ Liquoris potassæ,	f℥j.
Syr. senegæ,	f℥j.
Mist. glycyrrhizæ co.,	q. s. ad f℥vj.

M. Sig.: Take a dessertspoonful in a wineglassful of water every three hours for bronchitis, with scanty and tough expectoration.

As the urine is rendered alkaline under its use, liquor potassæ is frequently combined with other remedies in treating gonorrhœa:—

℞ Liquoris potassæ,	
Copaibæ,	āā f℥vj.
Mucilag. acaciæ,	f℥iij.
Spiritus ætheris nitrosi,	f℥vj.
Tincturæ opii,	f℥j.
Aquæ,	q. s. ad f℥vj.

M. Sig.: Take a tablespoonful well diluted, three or four times daily, in acute gonorrhœa.

In cystitis and pyelonephritis, the same combination can be used, in order to render the urine less irritating. If, however, in cystitis, alkaline decomposition has occurred, the administration of alkaline remedies will, as Ringer points out, aggravate the disorder by assisting the transformation of urea into carbonate of ammonium. The alkaline treatment in acute rheumatism is suited to plethoric subjects, with strongly acid perspiration. The bicarbonate is used in doses of 20 to 30 grains every four or five hours in cinnamon-water, or the citrate or acetate may be given in full doses. If the system is alkalinized early in the disease, there is less danger of cardiac complication. Very often the treatment is best begun with the iodide of potassium for a day or two, and then the bi-

carbonate is substituted. The iodide is of special value in chronic rheumatism in 10-grain doses, with compound syrup of sarsaparilla and water, three times a day. The carbonate may be added to a warm bath for rheumatic cases with benefit, especially in diseases of the skin of rheumatic origin. The acetate of potassium is the most diuretic of these salts, and is useful in œdema, ascites, and other effusions:—

℞ Potassii acetat., ... ʒiv.
Infusi pilocarpi,
Spts. junip. co., ... āā f℥ij.
M. Sig.: A dessertspoonful in water, every two hours, in suppression of urine.

In lithæmia and disorders of the urinary secretion, we obtain good results from the administration of the citrate or bitartrate:—

℞ Potassii bitartrat. (crystals), ... ℥ss.
Infus. juniperi, ... Oj.
M. et ft. sol.
Sig.: To be drunk during the day to increase the flow of urine.

The diuretic properties of the bitartrate render it valuable in chronic Bright's disease. For the same reason this salt is of advantage in the treatment of puerperal eclampsia. Both the bitartrate and acetate are of avail in œdema dependent upon disease of the heart. The deposition of uric acid and formation of stone in the bladder may be prevented by the persistent administration of an alkali, and it is probable that small calculi may thus be dissolved within the bladder. Continued alkalinity of the urine is best maintained by means of the citrate, as that salt is less apt to derange the functions of the stomach or exert a deleterious influence upon the blood-corpuscles.

℞ Potassii citrat.,
Lithii citrat., ... āā ʒij.
Div. in chartulas no. xxiv.
Sig.: Take one in a glass of Vichy water, every four hours, in lithæmia.

In hæmorrhoids the following is a useful laxative:—

℞ Potassii bitartrat., ... ℥j.
Sulphuris loti, ... ℥ss.
Pulv. aromat., ... ℥ss.
M. Sig.: A teaspoonful once or twice daily, made into a bolus with orange-syrup.

The citrate of potassium is of service in the first stage of acute bronchitis, and in the form of neutral mixture or effervescing draught it affords marked relief to the nausea and vomiting which accompany febrile affections. It is, likewise, well adapted to the irritable stomach of phthisis. Incontinence, from a too concentrated condition of the urine, is benefited by administration of the citrate. The tartrate of potassium

and sodium is a very useful saline laxative, and is serviceable in fevers. The Seidlitz powders are most efficient taken early in the morning, when the stomach is empty. Potassium sulphate is not used as a purgative, although it has some cholagogue power; its action is too severe, and it is very bitter. Being a hard and dry powder, the sulphate is utilized in pharmacy for the trituration of powders and pill-masses. The nitrate of potassium in small doses reduces temperature and the force and frequency of the heart's action, and is useful in the treatment of pneumonia, as in the following combination:—

℞ Potassii nitrat., ... gr. iij.
Pulv. ipecac. et opii, ... gr. i–ij.
M. et ft. chartulæ mitte tales no. xij.
Sig.: Take one every two or three hours.

The nitrate of potassium is also used in acute rheumatism. Unsized paper, saturated in a solution of nitre, is burned, and its fumes inhaled with good results in asthma. Potassium nitrite is still more depressing to the circulation, resembling nitro-glycerin,—indeed, practically identical in action,—according to Atkinson.* It may be substituted for the latter in the treatment of neuralgic heart affections (angina pectoris) and in epilepsy, in doses of gr. iii–v. Larger doses are dangerous. In asthma, it also may be given in conjunction with inhalation of nitre-paper fumes. The cyanide of potassium is used as a means of introducing hydrocyanic acid into the system for relief of the cough of bronchitis and phthisis. The permanganate has been given internally, it is said, with good results in flatulent dyspepsia and lithæmia. This salt, however, soon disagrees with the stomach. Neusser has recently reported favorably upon the action of the tellurate of potassium in the night-sweats of phthisis. He has found that this substance, in many cases, either suppresses or considerably diminishes the sweats. Pills containing 2 centigrammes ($\frac{1}{3}$ grain) were given at first, but, in some instances, it was necessary to double the dose after they had been in use for about a week. No toxic symptoms were ever manifested; the appetite sometimes seemed to be improved by the drug. It communicates a strong odor, resembling garlic, to the breath of the patient. For the therapeutic action of bromide of potassium see pages 485 to 488.

The **Chlorate of Potassium** is extravagantly praised by some and neglected almost entirely by others. It has been shown that, administered in 15-grain doses three times a day, it is serviceable in preventing disease of the placenta, and thus enabling a woman to go on to the end

* Journal of Anatomy and Physiology, January, 1888; paper on the "Pharmacology of the Nitrites and of Nitro-Glycerin," read before Section on Therapeutics and Materia Medica. Ninth International Medical Congress, Washington, D. C., September, 1887.

of term who had previously had several miscarriages. It appears, then, to be valuable in preventing intra-uterine death of the fœtus, if administered for four or five months in the above doses. In maternal stomatitis it is regarded by Bartholow as the only remedy worth mentioning, given in doses of gr. xv–xx, three times a day. In the sore mouth of mercurial salivation it should be given internally and used locally as a wash, and also in the membranous and ulcerative sore mouth of children. From a review of its action it appears that persons are not equally susceptible to its effects, since one can take, with very little evident effect, a dose which would produce very decided symptoms in another. Hence arises a necessity for commencing with small doses, and gradually increasing to the quantity required to produce the effect. Dr. J. G. Sinclair Coghill, of Ventnor, Isle of Wight, England, contributed to the Proceedings of the International Medical Congress, at Washington, a paper on the subject, which very fairly and ably sums up the value of the drug. He found it useful in cases of deficient oxygenation of the blood, especially in placental inadequacy (as above stated); also in pulmonary insufficiency, arising from many pathological conditions interfering with the function of the lungs. He finds it a cardiac stimulant in debility of the heart, whether organic or functional, probably by improving the quality of the blood; where the blood is impoverished, as after hæmorrhages, in anæmia, chlorosis, malarial cachexia, and in convalescence after acute diseases. In chlorosis, he gives the tincture of the chloride of iron in an effervescing solution containing 25 grains of chlorate of potassium, thrice daily, after meals. Quinine, digitalis, and nux vomica may also be used. It is best given in aërated water after food. It has decided antiseptic effects, and these are well shown when there is suppuration along the genito-urinary tract. In combination with arsenic (Fowler's solution) internally and chlorate lozenges (āā gr. iiss) locally, it is of singular efficacy in clergyman's sore throat or follicular pharyngitis. In diphtheritic croup Dr. Drysdale recommends:—

℞ Potassii chloratis, ... ʒij.
Syrupi limonis, ... f℥j.
Aquæ, ... f℥iij.
M. Sig.: Dose to a child under 2 years a teaspoonful, from 2 to 10 two teaspoonfuls, every half hour in urgent cases.

In diphtheria, it should not be used in full doses on account of the depressing action of the potash upon the heart. Waugh uses:—

℞ Potassii chloratis (pulv.), ... ʒj.
Acidi hydrochlorici, ... fʒiss.
Misce et adde
Tr. ferri chloridi, ... fʒij.
Aquæ, ... q. s. ad f℥iv.
M. Sig.: A teaspoonful to be given undiluted every two hours.

Free chlorine is generated in this mixture, which is based on Watson's celebrated formula. It has been very successful in Waugh's hands, succeeding in one case where sublimate applications (1 to 500) failed to check the spread of the disease. When diluted with water the above formula makes an excellent gargle. In the sore throat of phthisical patients we may give :—

℞ Potassii chloratis,		gr. xl.
Glycerini,		f℥ss.
Morphinæ hydrochlorat.,		gr. iss.
Syrup. aurantii,	q. s. ad	f℥iv.

M. Sig.: A teaspoonful occasionally.

The chlorate of potassium will often be found beneficial in chronic bronchitis, and may be serviceably combined with ipecacuanha and senega. In hæmaturia, purpura, scrofula, and many chronic affections, the chlorate has been used in some cases with marked results. In many affections of the skin, especially those attended with suppuration, the author can speak with unqualified approval of the action of the chlorate. In sycosis, pustular acne, eczema pustulosum, furuncles and carbuncles, the suppurative stage is decidedly abridged. It exerts a tonic influence in scrofula, and is peculiarly appropriate in the case of debilitated subjects of syphilis. The chlorate of potassium, as a rule, should be prescribed alone and not in combination with other agents, which may decompose it. The iodide of potassium has been already discussed under Iodine. (See page 695.)

PRINOS (U. S. P.).—**Prinos, Black Alder.**

Dose, ʒss.

Pharmacology.—The black alder, Prinos verticillatus (Aquifoliaceæ), or winter berry, is an indigenous shrub, or small tree, bearing clusters of bright-red berries. The bark, which is the officinal portion, contains resin, tannin, and some bitter principle not yet isolated.

Physiological Action.—It is astringent, tonic, and alterative.

Therapy.—Prinos is administered in the form of fluid extract, or a decoction, in gastric disorder and diarrhœa. Antiperiodic virtues have been attributed to this drug. It is also used internally and as an application in skin diseases.

PRUNUM (U. S. P.).—**Prune.**

Pharmacology.—The Prunus domestica (Rosaceæ), or prune-tree, is cultivated as an article of food in all temperate climates. The dried fruit is officinal. The French prunes are the best; they should be large, sound, and not too dry. As stewed fruit they are used as a relish upon the table, and are generally liked. The cooked fruit is laxative, and is

given to women after confinement, and to children. They may be made cathartic by the addition of senna or podophyllin, forming "medicated prunes."

PRUNUS VIRGINIANA (U. S. P.).—Wild Cherry.

Preparations.

Extractum Pruni Virginianæ Fluidum (U. S. P.).—Fluid Extract of Prunus Virginiana. *Dose*, ♏x–f℥j.

Infusum Pruni Virginianæ (U. S. P.).—Infusion of Prunus Virginiana (4 per cent). *Dose*, f℥i–iv.

Syrupus Pruni Virginianæ (U. S. P.).—Syrup of Prunus Virginiana (made by percolation, without heat, with 30 per cent. of bark and a little glycerin). *Dose*, f℥i–iv.

Pharmacology.—The bark of the Prunus serotina, or the Cerasus serotina (Rosaceæ), collected in autumn, has an aromatic, astringent, bitterish taste, and on maceration in water has the characteristic odor of hydrocyanic acid. This is developed by the presence of water, as the bark contains amygdalin and emulsin, which form hydrocyanic acid and an oil like the oil of bitter almond. Glycerin aids in keeping the dissolved matters in permanent solution, and is therefore added to both the fluid extract and the syrup. The former more fully represents the drug than the latter, since the tannin is soluble in the dilute alcohol, but not in water. The infusion and syrup, therefore, are less astringent than the fluid extract. A wine of wild cherry may be made by extracting the medicinal principles from the bark, or by the addition of 2 ounces of the fluid extract of wild cherry to 8 ounces of sherry wine. Dose, fℨj–f℥j.

Physiological Action.—Wild cherry is astringent, tonic, and sedative. Its pleasant flavor has made the syrup a popular vehicle for cough remedies. It increases appetite and promotes digestion, reduces expectoration and cough, and diminishes nervous irritability.

Therapy.—As a tonic, the infusion is very serviceable in phthisis, where it also lessens the cough and expectoration, strengthens the digestive organs, and reduces fever. In the cough of phthisis we get good results from the following combination:—

℞ Codeinæ,	gr. ij.
Tr. belladonnæ,	fℨij.
Syr. pruni Virg.,	q. s. ad f℥iij.

M. Sig.: A teaspoonful, or two, when cough is troublesome at night.

Wild cherry allays nervous or reflex cough, and may very appropriately serve as a vehicle for more potent remedies in whooping-cough. Palpitation of the heart, whether purely nervous or of dyspeptic origin, is benefited by the administration of this drug. Cases have been reported by Dr. Clifford Allbutt in which wild cherry was of service in mitral insufficiency, and in dilatation of the heart with chronic bronchitis

and dyspnœa. In nervous debility, insomnia, and poor digestion, small doses of the fluid extract are useful as a stomachic, taken before meals. In such cases, also, a ferrated wine of wild cherry, containing phosphate of iron (gr. ij in each f℥j) and fluid extract wild cherry, 10 per cent., will be found a good general tonic in doses of a drachm or two several times a day.

PTELEA CORTEX.—Ptelea Bark, Hop-tree Bark.

Pharmacology.—The Ptelea trifoliata (Rutaceæ), a tree of North America, affords, in the bark of the root, an appetizing tonic, occasionally useful during convalescence in dyspepsia, etc. It is best given in fluid extract; dose, ♏viii–xxx.*

PULSATILLA (U. S. P.).—**Pulsatilla, Meadow Anemone.**

Dose, gr. i–v, in fluid extract or tincture.

Pharmacology and Therapy.—The herb of Anemone pulsatilla and Anemone pratensis and of Anemone patens (Ranunculaceæ), collected soon after flowering. It should be carefully preserved and not kept longer than one year. Pulsatilla contains an acrid, fluid, volatile principle, which readily breaks up into **Anemonin** and **Anemonic acid.** The active principle being volatile, the herb must be fresh or, at least, not kept longer than a year, if carefully preserved.

Physiological Action.—The recent plant has some irritant properties, the juice causing numbness, tingling, and inflammation of the part to which it is applied. Internally, it lowers the pulse-rate and temperature in the inferior animals, and stupor and convulsions have been produced by large doses. In considerable quantity in the human subject it causes nausea and vomiting.

Therapy.—Pulsatilla has been used principally by irregular practitioners of German proclivities, and its reputation is based almost exclusively upon statements many of which do not bear exact and unprejudiced criticism. It is possible that to some of these observations there is some substratum of fact, but at present pulsatilla can scarcely be said to have any status in scientific medicine. Bartholow, however, considers pulsatilla adapted to the treatment of acute catarrh of the respiratory passages unattended by gastro-intestinal disorder. Borchain praises its action in acute epididymitis, given in doses of 1 or 2 minims of the tincture every two hours. Shapter has found it useful in hysterical convulsions and reflex spasms due to uterine disease. Phillips states that he has seen pulsatilla do good in mental disorders, and in sudden suppression of the menses, or lochia.

*Oldberg and Wall's Companion to the United States Pharmacopœia, second edition.

PUNICINE.

Punicine, or Pelletiérine.—The crystallizable alkaloid representing the tæniacidal properties of pomegranate-bark, named punicine by Carl Julius Sender,* is commonly known as pelletiérine. It can be used in drachm doses of a 10-per-cent. solution of the sulphate, or tannate, for tape-worm. (See Pomegranate, page 648.)

PYRETHRUM (U. S. P.).—Pellitory.

Preparation.

Tinctura Pyrethri (U. S. P.).—Tincture of Pellitory (20 per ct.). Not used internally.

Pharmacology and Physiological Action.—The root of Anacyclus pyrethrum (Rosaceæ), a small plant of Africa, cultivated in Europe, contains an alkaloid, **Pyrethrine,** an acrid resin, a volatile oil, tannic acid, starch, mucilage, etc. Pyrethrum has an acrid taste, and causes a free flow of saliva (sialagogue), with a prickling, pungent effect upon the tongue when chewed. If swallowed in considerable doses, it causes diarrhœa and tenesmus and dysenteric or bloody stools, with depression and stupor. A child 3½ years old nearly died with gastro-enteritis after swallowing 50 minims of the tincture. It is irritating to the skin and causes sneezing when inhaled into the nostrils.

Therapy.—In neuralgic, rheumatic, and other painful affections of the tongue or teeth, pellitory may be chewed or held in the mouth. Pellitory-root is sometimes used as a masticatory in paralysis of the tongue, and may be employed in order to stimulate the salivary glands when their secretion is deficient. Dr. Whitla finds that the sialagogue action of pellitory constitutes an excellent means for the removal of iodine from the system. A few drops of the tincture may be introduced into hollow, aching teeth; or, diluted with water, it may be used as a stimulating mouth-wash or gargle in scorbutus and sore throat, with relaxed mucous membrane.

Pyrethrum roseum, or Persian insect-powder, is a variety of pellitory growing in Asia, of which the flower-heads are very destructive to insect life. The powdered flowers are largely used to kill insects. If a small quantity is placed upon a plate and wet with alcohol and ignited, the fumes will kill or drive from the room small insects like flies or mosquitoes. It is also used in household economy, and in furniture to destroy chink-bugs, and also to remove fleas from dogs. Schagdenhauffen and Reeb† have discovered recently in these flowers an active principle, which they name **Pyrethrotoxic acid.** When hypodermatically injected into animals, it causes at first excitement, soon followed by complete

* Midland Medical Miscellany, June, 1885.

† American Journal of Pharmacy, September, 1890.

prostration and paralysis of lower extremities, and death by failure of respiration and circulation.

PYRIDINUM.—Pyridine. (C_5H_5N.)

Dose, f℥i–ij, for inhalation. It is not administered internally.

Pharmacology.—Pyridine is a clear, colorless, volatile liquid, with characteristic odor and pungent taste; in aqueous solution it has a marked alkaline reaction. It boils at 116° C. (240.8° F.), and is miscible with water, oil, alcohol, ether, and benzine, forming clear solutions. It gives precipitates with solutions of most metals, but not with lead acetate and magnesium sulphate. Pyridine is the foundation of a group of compounds known as pyridine bases, formed in the dry distillation of bones and other nitrogenous compounds, and as a decomposition product of nicotine and some other alkaloids. It was discovered in 1846 by Anderson. Chapman and Smith have made it by synthesis, by dehydrating amyl nitrite with phosphoric anhydride.

Physiological Action.—Upon the healthy adult, inhalations of the vapors of pyridine mixed with air produce flushing of the face, with quickening of the pulse and of the respiration, the latter lasting only a few moments, the former from fifteen minutes to ten hours, depending upon the amount inhaled. Pyridine produces slight giddiness and sometimes headache. In asthmatic patients the quickening of the respiration is not observed; on the contrary, the heart's action slowly falls to the normal, if it had been previously accelerated, without change in rhythm or force, while the respiration becomes slower, easier, and fuller, the dyspnœa disappearing. In most cases there is a desire to sleep without narcotism or interference with brain functions, the patient being easily wakened, as out of natural sleep. The odor of the drug is soon recognized in the urine, and it is probably partly expelled by the kidneys and in part by the lungs.

Therapy.—From the fact that tobacco-smoke, when inhaled, gives relief in asthma, German Sée was led to attribute the effect to pyridine; and from clinical experience, in a woman suffering with asthma and dyspnœa from heart disease, he was induced to advocate its further employment. One or two teaspoonfuls were poured upon a plate, and the fumes inhaled by the patient with her head directly over it. These inhalations were continued from twenty to thirty minutes, and were found to afford much relief, and frequently to abort or arrest the dyspnœic attack. In a number of other cases, including some both of pure asthma and of cardiac asthma, this treatment was resorted to with remarkably good results. Sée believed that pyridine is the most certain agent for bringing relief when iodine fails, and that it is superior to the hypodermatic use of morphine, its action being more lasting and better borne by the

system. Dr. Neff* also reported good results. Of 12 cases, 3 were of nervous asthma, with complete relief and no return of the attack; 3 cases of cardiac asthma were relieved; 3 of bronchial asthma had no return of attack; of 2 cases of dyspnœa in advanced phthisis 1 was slightly relieved, the other was not benefited; 1 case of asthma, as complication of gout, was cured. All unpleasant symptoms were confined to cases with long-standing emphysema, or valvular or degenerative heart disease, with small, irregular pulse. In advanced phthisis it should be used with care, and probably will fail. Pyridine is worthy of trial in angina pectoris.

PYROXYLINUM (U. S. P.).—**Pyroxylin, Soluble Gun-Cotton.**

Gun-cotton is white, dry, and entirely soluble in a mixture of alcohol and ether. It is inflammable and violently explosive. Used in making collodion. (See page 565.)

QUASSIA (U. S. P.).—**Quassia.**

Dose, gr. x–xxx.

Preparations.

Extractum Quassiæ (U. S. P.).—Extract of Quassia. *Dose*, gr. i–v.
Extractum Quassiæ Fluidum (U. S. P.).—Fluid Extract of Quassia. *Dose*, ♏v–xx.
Tinctura Quassiæ (U. S. P.).—Tincture of Quassia (10 per cent.). *Dose*, ♏xx–f℥j.
Infusum Quassiæ.—Infusion of Quassia (℥ij–Oj). *Dose*, f℥i–ij.

Pharmacology.—Quassia is the wood of Picræna excelsa (Simarubaceæ), a large tree of the West Indies, usually occurring in the form of small chips or raspings, nearly white, without odor, but very bitter. It is sometimes made into cups or vases, in which hot water is poured at night, to be drunk early in the morning, or through the day, as a bitter tonic. Quassia-wood contains a bitter, neutral principle, **Quassin,** crystallizing in needles, and readily soluble in alcohol and in hot water. It also has a minute quantity of **volatile oil,** but **no tannin.** The solid extract is aqueous, but the fluid extract is made with dilute alcohol. The tincture is 50 per cent. stronger than the same preparation in the preceding revision of the pharmacopœia.

Physiological Action.—Quassia is very destructive to flies and insects. A concentrated solution is poisonous to the lower animals, and caused serious symptoms of narcotism in a child of 4 years, as mentioned by Potter. Quassia is a simple bitter, without astringency; it is a good stomachic, and increases the appetite.

Therapy.—This drug is used as a tonic in dyspepsia, where it probably exerts both a tonic and an antiseptic action. It can be given with iron on account of the absence of tannic acid, and often has aromatics combined with it to improve the taste. It is useful during convalescence

* New York Medical Journal, March 13, 1886.

to stimulate the appetite, and may be combined with an alkali and given before meals. In children, an infusion of quassia is a useful agent as an enema to destroy thread-worms.

QUEBRACHO.—Aspidosperma.

Dose, f℥ss–j, in fluid extract.

Pharmacology.—The bark of the Quebracho blanco, or, more correctly, the Aspidosperma quebracho, Var. Blanco (Apocynaceæ), a large tree of Brazil, contains two alkaloids, **Aspidospermine** and **Quebrachine,** and other principles not yet studied. It has also been obtained in Catamarca, of the Argentine Republic, where it has a popular reputation as a febrifuge and antiperiodic. A fluid extract is the best preparation.

Physiological Action.—Quebracho is bitter and stimulant to the salivary glands, astringent to the intestinal tract. In large doses in animals it produces paralysis of the limbs, of central origin.* It also causes salivation, paralysis of respiration, and diminished frequency of the heart's action; death is caused by paralysis and convulsions due to apnœa. Moderate doses retard breathing, and make inspiration slower and fuller.

Therapy.—The special action upon the motor apparatus of respiration makes quebracho valuable in treating dyspnœa of all kinds, whether bronchial, cardiac, or nervous. In emphysema, with or without asthma, it has been very serviceable in the form of fluid extract, ♏xx–xl, several times a day. Quebracho is also of service in spasmodic croup. Dr. Picot states that it is advantageous to the respiration when taken before hill-climbing. The effect of quebracho in relieving cyanosis is very marked. This drug very sensibly diminishes the pulse and temperature in acute rheumatism and inflammations of serous membranes. An elixir, a wine (6 per cent.), and a tincture (40 to 50 per cent.) have also been used. The alkaloid aspidospermine has been employed as a febrifuge, and, according to Guttmann, its dose as an antiperiodic is 18 grains, the ordinary dose being 1 or 2 grains. It is soluble in oils or 50 parts of pure alcohol.

QUERCUS ALBA (U. S. P.).—**White-Oak Bark.**

Dose, f℥ss–j, in fluid extract or decoction.

Pharmacology.—The bark of Quercus alba (Cupuliferæ) contains **Quercitannic acid,** and a bitter principle, **Quercin;** also **pectin,** coloring matter, etc. There are no officinal preparations; but a decoction (℥j–Oj) is usually employed, and a fluid extract made with diluted alcohol is obtainable, but they are rarely used internally. Oak-galls from Quercus lusitanica also contain tannin, and, as they answer a similar purpose, they are more convenient for use than the white-oak bark.

* F. Penzoldt, Berliner klin. Wochenschrift, No. 19, 1879.

Physiological Action and Therapy.—A decoction of white-oak bark is occasionally used as an injection or wash in leucorrhœa; also in sore throat and nasal catarrh, but stains clothing, and may be substituted by solutions of tannic acid. The applications of tannic acid have been already considered (page 394). The powdered bark is an ingredient in tooth-powders; it was also formerly used as an absorbent application to ulcers and as a poultice in gangrene.

QUILLAIA.—Quillaia, Soap-Bark.

Preparations.

Pulvis Quillaiæ.—Powdered Quillaia. *Dose*, gr. x–xxx.
Extractum Quillaiæ Fluidum.—Fluid Extract of Quillaia. *Dose*, ♏xv–f℥ss.
Tinctura Quillaiæ.—Tincture of Quillaia (20 per cent.). *Dose*, f℥i–ij.
Decoctum Quillaiæ.—Decoction of Quillaia (5 parts in 200). *Dose*, f℥i–ij.
Saponin. *Dose*, gr. ss–ij.

Pharmacology.—The bark of the Quillaia saponaria (Rosaceæ), a tree of moderate size, a native of Chili, is brought to this country in flat pieces several inches wide and from 2 to 3 feet in length. The outer surface is brownish white, the inner whitish and smooth. It has a splintery fracture. It is destitute of odor, but is very acrid to the nasal passages. The infusion of saponaria, when shaken, froths like soap. This property depends upon the presence of an irritant, poisonous glucoside called **Saponin,** which has been found in a number of vegetable species and genera, and is probably identical with polygalin. Saponin was isolated in 1850 by Le Bœuf. It is a white, crystalline powder, the taste of which is at first sweet and afterward acrid. Saponin is slightly soluble in water, but more readily soluble in strong and boiling alcohol. The solutions of saponin froth when shaken. Its saturated alcoholic solution is a solvent for gums, resins, and oils, with which, after being mixed with water, it forms permanent emulsions.

Physiological Action.—The powder of soap-bark and solutions of saponin are strongly irritant to the Schneiderian membrane and excite sneezing. In weak solutions, saponin is a local anæsthetic; in concentrated form, it is a protoplasmic poison, and its local action destroys the energy of nervous and muscular tissue. Saponin exerts a specific influence upon the alimentary tract, since even intra-venous injections give rise to gastro-enteritis. Schroff found that 2½ to 3 grains of saponin produced irritative cough and secretion of mucus in the bronchial tubes, lasting for several hours, but no effect was manifested upon either the kidneys or skin. Saponin reduces the force and frequency of the heart's action, and finally paralyzes it.

Therapy.—It is principally as a topical remedy that quillaia has been employed, but, although its range of application is limited, it exhibits

decided power. Quillaia* is an excellent stimulant to chronic ulcers and chronic eczema, the affected parts being covered by a roller-bandage which has been saturated in an infusion of soap-bark. The same preparation is of value in hyperidrosis and bromidrosis. The hands and feet may be advantageously bathed in this solution every day or every second day, while the axillæ or face can be mopped by a sponge which has been dipped in the infusion. In dandruff and simple pityriasis, the watery solution of soap-bark is an efficient application. The tincture may be employed where more powerful action is required, as in chronic eczema or alopecia circumscripta, in which conditions it will often prove superior to the tincture of green soap. Piffard recommends a mixture of fluid extract of soap-bark with glycerin in certain forms of acne.

QUININA. For quinine and its associated alkaloids and preparations, see Cinchona, page 543.

RESINA (U. S. P.).—**Resin** or **Rosin, Colophony.**

Preparations.

Ceratum Resinæ (U. S. P.).—Resin Cerate (resin 35, yellow wax 15, lard 50 parts).

Emplastrum Resinæ (U. S. P.).—Resin Plaster, Adhesive Plaster (resin 14, lead plaster 80, yellow wax 6 parts; spread on muslin).

Linimentum Terebinthinæ (U. S. P.).—Turpentine Liniment (resin cerate 65, oil of turpentine 35 parts).

Pharmacology.—Resin is the solid residue after distilling off the volatile oil from turpentine. (See Terebinthina.) It enters into several officinal cerates and plasters, to which it gives adhesiveness. Resin is insoluble in water, but soluble in alcohol, ether, fixed and volatile oils.

Physiological Action.—It is slightly irritating to the skin, and internally is antiseptic and slightly astringent in its effects upon the alimentary canal.

Therapy.—Resin has been employed as a domestic remedy for diarrhœa, a few grains finely powdered being given every hour or two, but it is seldom used internally by regular practitioners. The fumes coming from boiling resin may be inhaled in chronic bronchitis and winter-cough. Resin cerate, or basilicon ointment, as it is sometimes called, is a popular dressing for ulcers, promoting cicatrization and granulation. Compound resin cerate, or Deshler's salve (Pharm. 1870), no longer officinal, contains crude turpentine, and is more stimulating than the plain cerate; it is sometimes applied to blisters to prevent their healing too quickly and to promote suppuration.

* See paper by author "On a Natural Soap and its Use in the Treatment of Diseases of the Skin," The Medical Bulletin, July, 1879.

RESORCINUM.—Resorcin.

Dose, gr. x–xv to ʒj.

Preparations.

Unguentum Resorcini.—Ointment of Resorcin.

Pheno-Resorcinum.—Pheno-Resorcin (carbolic acid 67, resorcin 33 parts).

Pharmacology.—Resorcin is obtained by fusing certain gum-resins with caustic potash. The process for obtaining it from gum ammoniac is described upon page 431. It is now prepared on a large scale synthetically. It crystallizes in small, colorless prisms or plates, has a neutral reaction, a sweetish taste, with slight pungency or acidity, and an odor which resembles that of carbolic acid. Resorcin melts at 219.2° F. and distills at 512.6° F. It was discovered by Hlasiwetz and Barth.

Resorcin is an oxyphenol, homologous with orcin, derived from benzol by the substitution of two hydroxyl groups for two atoms of hydrogen. Chemically, it is meta-di-hydroxy-benzol, $C_6H_4(H_2O)_2$. It is soluble in water and other solvents, except chloroform and carbon disulphide. The best vehicles for medicinal purposes are alcohol, glycerin, and syrup of orange. The dose usually is from 5 to 15 grains; a drachm may be given at a single dose as an antipyretic. It is a most efficient antiseptic and antiferment. Andeer* recommends butter as a vehicle for making an ointment (1 per cent.) extemporaneously.

Physiological Action.—Resorcin is non-irritant to the skin, and, injected subcutaneously, causes very little inflammation and no suppuration. In strong solutions, it irritates mucous membranes and sometimes vesicates them. In full doses (30 to 60 grains) resorcin acts as an antipyretic, reducing the temperature for two or three hours, but at the same time has the disadvantage of causing nausea, oppression, languor, and free perspiration. Above these amounts it is not safe to go, since by larger doses cerebral symptoms are induced, such as deafness, vertigo, confusion of vision, convulsions (clonic and tonic), rigidity of the muscles of the back of the neck. In lower animals, death occurs from failure of respiration and paralysis of motor tracts in the spinal cord. It is excreted chiefly by the urine, which it darkens or even changes to a bluish color; the addition of tincture of chloride of iron to such urine causes it to become a dark-violet color. Symptoms of poisoning in man are best treated by diffusible stimulants and diuretics; atropine and strychnine might be given hypodermatically.

Therapy.—The decided antiferment and antiseptic qualities of resorcin, with its solubility and not unpleasant odor or taste, make it a valuable application for the throat and nose in diphtheria;† it may also be adminis-

* Proceedings Ninth International Congress, vol. iii, p. 100.

† "Resorcin in Diphtheria," Centralblatt f. d. gesammte Therapie, Heft 9, 1890.

tered internally to disinfect the gastro-intestinal tract, and thus prevent re-infection. It is furthermore of service to impregnate the atmosphere of the sick-chamber by the spray of a 5-per-cent. solution of the same agent. In erysipelas, puerperal fever, and septicæmia, resorcin has been used, both locally and internally, with marked benefit. A 2-per-cent. solution makes a spray for various catarrhal and other affections. In saturated ethereal solution, resorcin acts as a slight caustic, especially to raw surfaces or mucous membranes. The powder may be dusted on granulations or combined with boracic acid (1 to 20 or 1 to 10); it is very efficient in discharges from the ear. The ear should be thoroughly cleansed with a solution of boric or carbolic acid, and dried; after this the above powder can be blown into the canal. To foul ulcers and sloughing wounds an ointment containing 1 or 2 drachms of resorcin to the ounce is an excellent application. Chancroids and ulcerated syphilitic lesions receive decided benefit from the same preparation. A 1- or 2- per-cent. watery solution of resorcin is of service in acute or chronic conjunctivitis and wounds of the cornea. It is likewise a beneficial application to tuberculosis of the larynx, to mercurial and other forms of stomatitis, and to thrush. In whooping-cough and hay fever this remedy is advantageously used in the form of a spray, a 2-per-cent. solution being efficacious in the former disease, while in hay fever the solution has been made as strong as 20 per cent. Resorcin ointment has been employed with good effect in certain diseases of the skin, as chronic eczema, psoriasis, alopecia circumscripta, and lupus erythematosus. In the abortive treatment of herpes, M. Leloir employs the following solutions (*Medical News*):—

℞ Resorcin.,	ʒss.
Cocain. hydrochloratis,	gr. viij vel xxx.
Acidi tannici,	ʒiss.
Alcohol. (90 per cent.),	f℥iij.—M.

Or,

℞ Cocain. hydrochloratis,	gr. xv.
Ext. cannabis Indicæ,	ʒiss.
Spt. menth. pip.,	fʒiiss.
Alcohol. (90 per cent.),	f℥ij.—M.

M. et ft sol.

Resorcin-soap (5 or 10 per cent.) has been found useful in ringworm of the scalp and other parasitic skin diseases, as first used by Julius Andeer. Resorcin is preferable to carbolic acid for internal administration, and can be given as an antiferment in dyspepsia and digestive disorders. In gastric catarrh, gastralgia, and ulcer of the stomach, resorcin has rendered good service. It is also serviceable in the diarrhœa of children. A solution of resorcin has been successfully employed as an injection in gonorrhœa and for washing out the bladder, there being but little danger

from absorption of the remedy. Pheno-resorcin is soluble, forming a liquid with 10 per cent. of water, and may be used like carbolic acid. In epithelioma of the skin, resorcin has given excellent results in the hands of Dr. Mario Luciani, who reports 2 cases of cutaneous epithelioma in which he claims to have effected a complete cure by the application of an ointment containing resorcin. He used the following formula:—

℞ Resorcini,	ʒiiss.
Petrolati,	℥j.

M. Sig.: Apply once a day to the ulcerated surface after previously cleansing with a 2-per-cent. watery solution of borax.

One case, a woman of 48 years, with an ulcer upon her forehead, was cured in three months; and in another, 60 years of age, with the same disease upon her lip of about a year's duration, this simple treatment was followed by an equally happy result. No microscopic examination appears to have been made in either case in order to establish the diagnosis (*Journal American Medical Association*).

RETINOL.

Pharmacology and Physiological Action.—Retinol, or Rosinol ($C_{35}H_{16}$), is a liquid hydrocarbon, obtained by the dry distillation of colophony. It is of a brown or yellowish color, has the consistency of a fat, and has a slightly bitter taste; its reaction is slightly acid on account of the presence of traces of picric acid. It forms a varnish-like coating over a surface when applied. It shares the antiseptic properties of the other balsams, and possesses the additional advantage of dissolving a great number of active substances, such as oil of cade, camphor, naphthol, balsam of Peru, etc. By mixing with a proper proportion of colophony, with oak-leaves or borate of sodium, a mass can be obtained sufficiently adhesive to allow it to be made into suppositories for vaginitis, etc.* Retinol is non-irritating when applied to the skin, and is an excellent vehicle for medicaments in cutaneous diseases. It does not become rancid and is unchangeable by time or light. The price is moderate.

Therapy.—M. Barbier gives a number of formulæ for its use, from which the following are taken:—

℞ Retinol.,	ʒiiss.
Lanolini,	ʒj gr. xv.
Sodii bicarbonatis,	gr. ij.

M. et ft. unguentum.

This is used in the ophthalmological clinic of Dr. Hubert for conjunctivitis, simple or gonorrhœal affections of the lids, the tear-ducts, and for the preparation of dressings and protection of instruments; or the following, of greater consistence, may be ordered:—

* Drs. Balzar and Chevalet, La Médecine Moderne, April 24, 1890.

℞ Retinol.,
Resinæ,
Lanolini, ... āā ʒij.
M. et ft. unguentum.

In diphtheria, the following has been used as a topical application :—

℞ Retinol., ... ℥ss.
Camphoræ, ... gr. xxx.
Naphthol., ... gr. xv.
M. et ft. ung.
Sig.: Apply to the affected areas.

℞ Retinol., ... ℥ij.
Beta-naphthol., ... ʒiss.
Saponis viridis, ... ℥ij.
Cretæ preparatæ, ... ʒiij.
M. Sig.: Apply to affected parts, for scabies.

In some skin affections, the following may be used with advantage :—

℞ Retinol., ... ʒij.
Glycerit. amyli, ... ʒiij.
M. Sig.: For external application as directed.

Or this :—

℞ Retinol.,
Ol. cadini, ... āā ʒiv.
M. Sig.: For psoriasis, chronic eczema, etc.

M. Vigier* states that retinol gives excellent results in vaginitis and in blenorrhœa, as a topical application. It is antiseptic, unirritating, and, in a large number of skin diseases, it gives excellent results either alone or as an antiseptic excipient for other substances.

RHAMNUS CATHARTICUS.—Common Buckthorn.

Preparations.

Extractum Rhamni Catharticæ Fructus Fluidum.—Fluid Extract of Buckthorn-Berries. *Dose*, fʒi–iss.

Rhamni Catharticæ Succus.—Buckthorn-Juice. *Dose*, ♏xv–fʒj.

Syrupus Rhamni Catharticæ.—Syrup of Buckthorn (buckthorn-juice with ginger, sugar, allspice, and alcohol). *Dose*, ʒi–ij.

Pharmacology.—The fruit of the common buckthorn, Rhamnus catharticus (Rhamnaceæ), is decidedly cathartic and cholagogue; the bark also has these properties, and, this species being naturalized in this country, probably it is often substituted for the officinal frangula-bark, which is the alder buckthorn, an allied species of rhamnus. (See page 634.) Cascara sagrada, or Rhamnus purshiana, is another variety of the same species. The fruit is purplish black, and, when dried, is about the

* "Du Retinol et de Son Emploi en Médecine," par F. Vigier. Journal de Médecine de Paris, November, 1890, page 641.

size of a pea; the pulp contains four seeds; odor slight; taste nauseating, bitter, and acrid. The active principle is **Rhamnocathartin,** an amorphous, yellow, brittle substance.

Physiological Action.—All the species of Rhamnus possess purgative properties of greater or less activity, but some are much more violent in action than others. Nausea, vomiting, and severe griping pains often attend their purgative action, to avoid which aromatics are usually added, as in the syrup, which formerly was largely used in Europe, but not in this country to any extent. The common buckthorn likewise produces extreme dryness of the mouth and throat.

Therapy.—The preparations of Rhamnus catharticus are used for the same purposes as frangula, but are more severe in their action than the next variety to be considered. It may be employed in dropsy, and was formerly used in the treatment of gout and rheumatism.

RHAMNUS PURSHIANA.—Cascara Sagrada.

Pharmacology.—Rhamnus purshiana (Rhamnaceæ) is a shrub or small tree, 10 to 20 feet high, growing on the Pacific coast, and is sometimes known as the California buckthorn. The bark is the portion used, and an analysis by Prof. A. B. Prescott * showed its chief constituents to be a bitter, brown resin; a red resin, a light-yellow resin; tannic, malic, and oxalic acids; a neutral, crystallizable substance; a volatile oil, wax-starch, and a fat oil of yellowish color. Professor Wenzell also distinguished a glucoside, and Meier and Webber a peculiar ferment.

Physiological Action.—Cascara sagrada is not a purgative so much as it is a laxative with tonic properties, the latter being attributable to the bitter principle.

Therapy.—This agent, in the form of fluid extract (in doses of ♏xv three times daily), is useful in chronic constipation. The dose should be gradually increased until the bowels are moved naturally once daily, and the remedy can then be given less frequently and the dose reduced. It is a peculiarity of this drug that it is not a cathartic, and its use should be preceded by a dose of castor-oil to clear the alimentary canal. It has the advantage of producing natural motions of the bowels by its tonic action upon the intestinal glands, increasing secretion and peristalsis. The dose is reduced after the natural condition of the bowels is established; it does not require to be given in increasing quantities, as do the ordinary resin-bearing cathartics. It also is a valuable hepatic tonic in congested liver and in duodenal catarrh. Cases of indigestion, with furred tongue, sallow skin, eructations of gas, constipation, are benefited by the following prescription:—

* New Preparations, February, 1879, page 27.

℞ Ext. rhamni purshianæ fl., ... f℥j.
Glycerini,
Elixir. aromat., ... āā f℥ss.

M. Sig.: Take from one-half to one teaspoonful, directly after eating, three times daily, until the symptoms are relieved.

In cases of chlorosis, Luteaud gives:—

℞ Ammonii et ferri citrat., ... 40 parts.
Ext. rhamni purshiana fl., ... 40 "
Saccharin., ... 1 part.
Aquæ destillatæ, ... 4000 parts.

M. Sig.: A teaspoonful to be taken before each meal, for constipation.

In atony of the bowels, a combination with berberis aquifolium is useful:—

℞ Ext. rham. pursh. fl.,
Ext. berberis aquifol. fl.,
Syrupi, ... āā f℥j.

M. Sig.: Dose, a teaspoonful four times a day.

In constipation with gastric irritability, Dr. J. H. Bundy, who first introduced the remedy to the profession, proposed the following:—

℞ Ext. rhamni catharticæ fl., ... f℥ss.
Ext. berberis aquifol. fl., ... f℥j.
Acid. hydrocyanici dilut., ... f℈j.
Syrup. (vel ext. malti), ... q. s. ad f℥iv.

M. Sig.: Teaspoonful after meals and at bed-time.

Special Forms.—Where the bitterness is an objection we may use the Cascara Cordial of Messrs. Parke, Davis & Co., in which the taste is well covered by aromatics, or the fluid-extract formula of 1887 (P., D. & Co.) may be used. This tasteless preparation is permanent, will not precipitate, and is entirely soluble in water. The solid extract of cascara sagrada makes a pill-mass which does not soften or decompose when made up with powdered marsh-mallow. Messrs. Parke, Davis & Co. also prepare a concentrated preparation, Cascarin (formula 1887), which is presented in scale form, is not hygroscopic, is readily reduced to powder, almost tasteless, soluble in water, and contains only the active principles of the drug. (Dose, gr. $\frac{1}{4}$–$\frac{1}{2}$.)

RHEUM (U. S. P.).—**Rhubarb.**

Dose, gr. i–xx.

Preparations.

Extractum Rhei (U. S. P.).—Extract of Rhubarb. *Dose*, gr. ii–x.

Extractum Rhei Fluidum (U. S. P.).—Fluid Extract of Rhubarb. *Dose*, ♏x–f℈j.

Mistura Rhei et Sodæ (U. S. P.).—Mixture of Rhubarb and Soda (fluid extract rhubarb 30, sodium bicarbonate 30, spirit of peppermint 30, water q. s. ad 1000 parts). *Dose*, f℈j.

Pilulæ Rhei (U. S. P.).—Rhubarb Pills (each gr. iij). *Dose*, one to three pills.

Pilulæ Rhei Compositæ (U. S. P.).—Compound Pills of Rhubarb (rhubarb, gr. ij; aloes, gr. iss; myrrh, gr. j). *Dose*, one to three.

Pulvis Rhei Compositus (U. S. P.).—Compound Rhubarb-Powder (rhubarb 25, magnesia 65, and ginger 10 parts). Gregory's Powder. *Dose*, ʒss–j.

Syrupus Rhei (U. S. P.).—Syrup of Rhubarb, 9 per cent. (sliced rhubarb 90, cinnamon 18, potassium carbonate 6, sugar 600, and water ad 1000 pts). *Dose*, for a child, fʒj.

Syrupus Rhei Aromaticus (U. S. P.).—Spiced Syrup of Rhubarb (aromatic tincture of rhubarb 1, simple syrup 9 parts). *Dose*, f℥ss.

Tinctura Rhei (U. S. P.).—Tincture of Rhubarb (rhubarb 12, cardamom 2, diluted alcohol q. s. ad 100 parts). *Dose*, ℥ss.

Tinctura Rhei Aromatica (U. S. P.).—Aromatic tincture of rhubarb (rhubarb 20, cinnamon 4, cloves 4, nutmeg 2, diluted alcohol q. s. ad 100 parts). *Dose*, fʒi–vj.

Tinctura Rhei Dulcis (U. S. P.).—Sweet Tincture of Rhubarb (rhubarb 8, liquorice 4, anise 4, cardamom 1, diluted alcohol q. s. ad 100 parts). *Dose*, fʒi–vj.

Vinum Rhei (U. S. P.).—Wine of Rhubarb (rhubarb 10, calamus 1, and stronger white wine q. s. ad 100 parts). *Dose*, fʒi–iv.

Tinctura Rhei Aquosa (N. F. and Ph.G.).—Watery Tincture of Rhubarb, or Compound Infusion of Rhubarb (rhubarb 100, borax 10, potassium carbonate 10, macerated for ten minutes with boiling water 850; then add alcohol 120, and after one and a quarter hours express and filter; add through the filter cinnamon-water 125 parts. Each fluidrachm represents 5¾ grains of rhubarb). *Dose*, fʒi–vj.

Tinctura Rhei et Gentianæ (N. F.).—Tincture of Rhubarb and Gentian (each fluidrachm represents rhubarb, gr. iv, and gentian, gr. j). *Dose*, fʒi–℥ss.

Pharmacology.—Rhubarb is the root of Rheum officinale and of other undetermined species of Rheum (Polygonaceæ). Its habitat is China. The European rhubarb, R. rhaponticum, is not one-half as active and is not recognized by the pharmacopœia. The peeled and dried root of the Chinese or East India rhubarb, of a light color and good odor, should only be used in medicine; powdered rhubarb is inferior, and, if not adulterated, at least is largely made up of inferior, damaged, and worthless or worm-eaten rhubarb. The active principles are a glucoside called **Chrysophan,** with **Chrysophanic acid, Phæorhetin, Emodin, Erythrorhetin, Aporhetin, Rheotannic and Rheumic acids.** The grittiness of rhubarb is due to crystals of oxalate of lime contained in the root.

Physiological Action.—When taken into the mouth, rhubarb has a peculiar, bitter, slightly astringent taste, and increases the flow of saliva; in the stomach and intestinal tract the secretions are likewise increased and the peristaltic movements stimulated proportionately to the size of the dose, but after the first effects have been displayed the secretions are reduced by the secondary astringent action of the drug. The resinous constituents act upon the liver, increasing the quantity of bile; according to Rutherford, it is a certain though not a powerful hepatic stimulant. The bile secreted under its influence has the normal composition, and it is, therefore, a true cholagogue. The coloring matter is largely excreted by the kidneys, and the urinary flow is increased. In small doses, up to 5 grains, rhubarb is a stomachic tonic, which makes

it a valuable constituent in dinner pills to aid digestion and prevent constipation. As a purgative, in doses of ½ drachm to a drachm, it acts slowly and in the course of seven or eight hours produces copious yellow stools containing bile. Griping may be due to the drug itself, or to the bile which is poured out under the action of its resinous constituents, notably phæorhetin. The cathartic principles may be absorbed through the integument, when applied on a poultice or spongio-piline; it is, therefore, a systemic purgative. These purgative constituents are excreted by the liver mainly, but also by the intestinal glands, the kidneys, and skin. After a woman has taken a dose of rhubarb, her milk may contain enough of these principles to purge the nursing child. Powdered rhubarb has been successfully employed as a dressing to chronic ulcers, but more powerful remedies have generally taken its place.

Therapy.—Rhubarb is a good stomachic purgative, especially in the treatment of children's disorders caused by errors in diet, rich food, etc. The spiced syrup of rhubarb in teaspoonful doses may be given to an infant with indigestible food or curd in its stomach, or when its gastro-intestinal tract contains mucus from bronchial catarrh, etc. The mixture of rhubarb and soda is a good antacid and carminative for babies suffering with colic and cramps. In adults, it may be given with special advantage in hot water, fifteen or twenty minutes before eating meals, especially in cases of gastric catarrh. In summer diarrhœas of adults or infants, the irritation arising from the presence of unsuitable or undigestible food is at once relieved and the cause removed by a dose of the aromatic syrup or tincture of rhubarb. Where there is intestinal dyspepsia and colalgia or cramps, the sweet tincture will be found very efficient and acceptable. Rhubarb may be combined thus:—

℞ Pulv. rhei,		ʒiss.
Sodæ bicarb.,		ʒij.
Spiritus ammonii aromat.,		fʒiij.
Spiritus myristicæ,		fʒvj.
Infus. carophylli,	ad	f℥viij.

M. Sig.: A half to a tablespoonful three or four times a day.

In children with acid discharges from the bowels, the combination with magnesia is especially useful. In weak digestion with deficient secretion, small doses of the tincture are valuable:—

℞ Tinct. rhei,		fʒij.
Tinct. cardamom. co.,		
Elixir. aromatic.,	āā	f℥ss.

M. Sig.: Take twenty to forty drops before each meal.

Urticaria due to indigestion may sometimes be relieved by rhubarb. It is a useful ingredient in purgative pills, where a cholagogue effect is desired, especially where hæmorrhoids are present:—

℞ Massæ hydrarg.,	gr. vj.
Ext. rhei,	gr. iij.
Ext. colocynth. co.,	gr. vj.
Saponis,	gr. ss.

M. et ft. pil. no. iij.

Sig.: To be taken at bed-hour, and followed in the morning by a teaspoonful of Rochelle salt in water before breakfast.

Constipation and hæmorrhoids, dependent upon pregnancy, are benefited by the administration of rhubarb. This remedy is considered by some practitioners as of special value in gouty subjects. Rhubarb has been known to cause a macular or vesicular rash.

RHŒAS.—Red Poppy.

Preparations.

Extractum Rhœados Fluidum.—Fluid Extract of Poppy-Flowers. *Dose,* ♏xxx–f℥iss.
Syrupus Rhœados.—Syrup of Red Poppy. *Dose,* f℥i–ij.

Pharmacology and Therapy.—The petals of the red poppy, Papaver rhœas (Papaveraceæ), cultivated in gardens, contain a coloring matter and **Rhœadine,** but probably no morphine. The preparations are used as coloring agents in pharmacy; although doses are quoted above, the remedy is seldom, if ever, employed. The taste is mucilaginous and bitter; it may act as a simple bitter, as a stomachic tonic during convalescence.

RHUS AROMATICA.—Fragrant or **Sweet Sumach.**

Dose, ♏v–f℥iss, in fluid extract.

Pharmacology.—The bark of the root of Rhus aromatica (Anacardiaceæ), growing in the eastern portion of this country, contains a resin, volatile oil, and tannin.

Physiological Action.—Rhus aromatica is astringent, tonic, stimulant, and diuretic.

Therapy.—Sweet sumach has been used as an astringent in diseases of the kidneys and genito-urinary tract, as in cystitis and hæmaturia. It is likewise said to check menorrhagia and night-sweats. It is employed in atonic diarrhœa or summer dysentery, after a preliminary purge to remove offending substances from the alimentary canal. It has been lauded as a remedy for nocturnal enuresis of children, a drachm of a good fluid extract being administered in diminished doses during the day. In larger doses this drug has exerted a good effect in hysterical enuresis. In diabetes, both mellitus and insipidus, it has also proved of service.

RHUS GLABRA (U. S. P.).—**Sumach-Berries.**

Preparation.

Extractum Rhois Glabræ Fluidum (U. S. P.).—Fluid Extract of Sumach-Berries. *Dose,* f℥i–ij.

Pharmacology.—The fruit of Rhus glabra (Terebinthaceæ, Anacardiæ), a common shrub along the roadsides in the United States, contains **tannic acid**, besides potassium and calcium malates and a red coloring matter.

Therapy.—It is a good astringent in the form of decoction, or fluid extract, for a mouth-wash or gargle in stomatitis, spongy gums, or pharyngitis, and as a topical application in skin diseases and ulcers in domestic practice. The following is a useful gargle for sore throat :—

℞ Potassii chloratis,	ʒij.
Ext. rhois glabræ fl.,	f℥ss.
Glycerini,	f℥iss.
Aquæ rosæ,	f℥iv.

M. Sig.: Add a tablespoonful to a wineglassful of water, and use as a gargle, frequently.

Rhus glabra is rarely used internally, but has been given for catarrhal disorders of the stomach and bowels, with diarrhœa.

RHUS TOXICODENDRON (U. S. P.).—Poison-Oak, Poison-Ivy.

Pharmacology.—The fresh leaves of Rhus toxicodendron (and Rhus radicans, N. O. Terebinthaceæ, Anacardiæ), indigenous to the eastern portion of North America, contain a volatile acid, **Toxicodendric acid**, tannin, etc. As the volatile acid is the chief constituent, the fresh leaves only are used; dried leaves are worthless. Several other species of rhus, as the swamp-sumach (R. venenata), contain this constituent. The lac or varnish upon Chinese or Japanese boxes is made of some species of sumach, and very susceptible individuals may be poisoned by handling them, or by being present when such varnish is used. The rhus radicans is not a distinct species from the officinal rhus toxicodendron, which is sometimes erect and sometimes climbing. The poison-sumach may be recognized by trifoliate, compound leaves, resembling the ordinary ivy in having adventitious roots along the under side of the climbing stem, with the exception that in the poison-sumach the roots are given off in bunches at the nodes opposite the insertion of the petiole or leaf-stem, while in the ivy they grow from the entire under side of the stem. It is distinguished from the Ptelea trifoliata by having petiolate instead of sessile leaflets. The poisonous principle resides especially in the juice, which is acrid and milky, turning black upon exposure to the light.

Physiological Action.—The fresh leaves are very irritating to the skin, although the effect is much more marked in some individuals than in others. In characteristic cases of poisoning there is set up an acute dermatitis, with a great deal of œdema and hyperæmia of the skin; frequently vesicles or blebs are formed, accompanied by much irritation and itching. This inflammation resembles erysipelas, spreading from

the parts first affected to surrounding skin and mucous membrane. With this there is considerable general disturbance, pains in the abdomen, nausea and vomiting; diarrhœa or diuresis may occur, with passage of blood. Fever and profuse perspiration may also be observed, with pains in the joints and lumbar region. The effects of the poison last from a week to a fortnight, and are followed by free desquamation of the affected surface.

Poisoning.—Many remedies have been advocated; probably the free application of a carbolized alkaline wash to neutralize the poison, such as Dobell's solution (page 368), followed by fluid extract of grindelia diluted with water (1 to 10) or distilled extract of hamamelis, will give as good results as any other. When the inflammation is in the face, and accompanied by much swelling of the eyelids, alum curd is very efficient.

Therapy.—Rhus toxicodendron is rarely used by regular practitioners, although Phillips declares that it is useful in rheumatic pains and affections of fibrous tissues; also in certain skin affections, erythema, erysipelas, herpes, and pemphigus. In rheumatic paralysis it is claimed to be efficient. Externally, half a drachm of the tincture (1 to 2 of alcohol) in a pint of water may be used as a stimulating application, with advantage, for sprains, chilblains, burns, stings of insects, etc.

Recently some contributions have appeared in medical journals, attempting to revive the former internal administration in cases of rheumatism and neuralgia, or so-called rheumatic pains. Prof. H. C. Wood, as editor of the *Therapeutic Gazette*, gives his experience as follows: "Nearly ten years ago I was much impressed with the accounts, published in various homœopathic journals of Philadelphia, of rhus toxicodendron for rheumatism, and being at the time visiting physician to the Philadelphia Hospital, with a large number of cases of subacute, chronic, and acute rheumatism under my care, I availed myself of the opportunity to test the virtue of the drug. I obtained the homœopathic tincture from a large homœopathic pharmacy. I tried it in all forms and doses, homœopathic, small and large, and found it exceedingly uncertain in its action and giving no definite good result. I was not able to see that the patients progressed, on the average, any more rapidly when taking it than when left to nature and nursing." *

RICINI OLEUM (U. S. P.).—**Castor-Oil.**

Dose, fʒj–℥j.

Pharmacology.—Castor-oil is a fixed oil, expressed from the seeds of Ricinus communis (Euphorbiaceæ), cultivated largely as an ornamental plant in our gardens, coming originally from India. The oil

* Therapeutic Gazette, February 15, 1890, p. 95.

should be obtained without heat simply by crushing and pressing the seeds. It consists mainly of ricinoleic acid, combined with the base glyceryl as **Ricinoleate of glyceryl,** together with other fixed oils, a resin, and possibly an alkaloid, **Ricinine** (not purgative), and an acrid, drastic principle. It is a colorless, rather viscid, oily liquid, of faint, peculiar odor, and a bland, nauseating, acrid taste. It is soluble in an equal part of alcohol. It is a good addition to liniments on account of its density, and enters into the compound liniment of mustard (15 per cent.) and flexible collodion (3 per cent.). Castor-oil is completely soluble in absolute alcohol, which is employed as a test for the detection of impurities. Pure castor-oil dissolves in spirit of 0.838 specific gravity at a temperature between 38° and 43° C. (100.4° to 109.4° F.), while foreign oils only dissolve at a considerably higher degree.*

Physiological Action.—When applied to the skin no irritation results; on the contrary, it is borne by the conjunctiva, acting as a protective and sedative. The nauseating taste is due almost entirely to its odor, and it can be taken much better if the nose be held during the act of swallowing. The odor may also be overcome by peppermint and other flavoring agents. As a purgative, it is classed as a laxative in small doses (♏x–f℥j), becoming more active in full doses (f℥ss–j). The laxative effect results about four hours after administration.

Therapy.—Castor-oil may be used as a menstruum to retain drugs in contact with the surface. The following is a suitable formula:—

℞ Olei ricini, ... f℥ss.
Spiritus vini rectificati, ... f℥ij.
Tinct. cantharidis, ... f℥j.
Spiritus rosmarini,. . . . . f℥j.
Spiritus odorati, ... ad f℥viij.—M.

A drop of castor-oil in the eye will often relieve the irritation caused by a particle of sand, or by granular lids. Dr. S. Mitchell has found a solution of cocaine in castor-oil to be an excellent application to corneal ulcer, relieving pain and healing the lesion after other solutions had been used in vain. Fomentations of the mammary glands with castor-oil plant leaves, wilted with hot water, are useful in promoting the secretion of milk. Castor-oil as a purgative is useful in children, and in pregnant women, for piles or fissures of the anus, or after parturition, acting without any irritant effect, according to Brunton; but this is denied by Fordyce Barker, who, from clinical experience, declares that it is not suitable for such cases, and in pregnancy or after parturition aloes is a preferable purgative. Castor-oil is a good vermifuge, and should be given before and after the administration of other anthelmintics. In

*J. Arthur Wilson, in American Journal of Pharmacy, December, 1890.

acute diarrhœa or dysentery, treatment should commence with 1 or 2 drachms of oil, combined with 5 to 10 minims of laudanum. This removes irritating substances and soothes the intestines. Dr. Young, of Florence, has successfully treated acute diarrhœa with small doses of castor-oil, and suggests the following formula :—

℞ Olei ricini,	♏xxiv.
Sp. chloroformi,	f℈iss.
Morphinæ hydrochlor.,	gr. j.
Pulv. acaciæ,	℈iiss.
Syr. simplicis,	f℥ss.
Aquæ,	q. s. ad f℥iv.

M. Sig.: A dessertspoonful every hour and a half for an adult.

Phillips, also, has found the above mixture efficacious. In chronic dysentery, Brunton recommends 15 minims of castor-oil with 5 to 10 minims tincture of opium, given three times daily, or used thus :—

℞ Ol. ricini,	f℈ss.
Tinct. opii,	♏x vel xxx.
Syr. sarsaparillæ vel Aquæ menth. pip.,	f℥iss.
Pulv. acaciæ,	q. s.

M. Sig.: A teaspoonful or two three or four times a day.

A teaspoonful of oil will greatly relieve an infant suffering with bronchial catarrh.

Special Forms for Administration.—It may be given in soft capsules, which can be obtained of any size from 10 minims to ½ ounce. If the oil be given the first thing in the morning, an hour before breakfast, 10 or 20 drops are generally sufficient to open the bowels. This dose may be given in a teaspoonful of peppermint-water and brandy, the proportion being such that the oil neither sinks nor swims in the mixture.* Lemon- or orange- juice, coffee, froth of porter or beer, are also used as vehicles, but the best is the extemporaneous dose prepared at the soda-water fountain by the obliging druggist. The following mixture is recommended by a contributor to the *American Druggist*.† In it the disagreeable taste of the oil is replaced by a pleasant flavor of almonds :—

Castor-oil,	30 parts.
Bitter almonds,	2 "
Sugar,	30 "
Gum tragacanth.,	½ part.
Orange-flower water,	10 parts.
Water,	120 "

The only drawback to this mixture is that it requires a good deal of it for a dose, a teaspoonful of the oil being contained in about 5 tea-

* Brunton's Pharmacology, Therapeutics, and Materia Medica, 1885, p. 938.
† Boston Medical and Surgical Journal, February 12, 1891, p. 175.

spoonfuls of the mixture. The taste of codliver-oil is tolerably well disguised by highly-seasoned beef-tea. R. R. Mitchell advises for the same purpose a mixture of equal parts of the oil, aromatic syrup of rhubarb, and cascara cordial. Dr. Wabah McMurray, of Sydney, Australia, says, to disguise the unpleasant taste of castor-oil, a good idea is to ask the patient to take f℥j cream in the mouth and apply it with the tongue over the entire surface. This prevents the oil from adhering to the mucous membrane. In children with griping diarrhœa and green stools containing casein, to disguise the taste of the oil and act well, Dr. McMurray recommends the following combination :—

℞ Ol. ricini,	f℥j.
Mucil. acaciæ,	q. s.
Tinct. opii,	♏v.
Aquæ menth. pip. vel	
Aquæ chloroformi,	f℥ij.

M. Sig.: A teaspoonful every four hours.

ROSA.—Rose.

Preparations.

Rosa Centifolia (U. S. P.).—Pale Rose. The petals of Rosa centifolia (Rosaceæ).

Rosa Gallica (U. S. P.).—Red Rose. The petals of Rosa Gallica collected before expanding.

Oleum Rosæ (U. S. P.).—Oil of Roses ("attar of rose"). The volatile oil distilled from the fresh flowers of Rosa Damascena (Rosaceæ).

Aqua Rosæ (U. S. P.).—Rose-Water (from pale rose).

Unguentum Aquæ Rosæ (U. S. P.).—Rose-Water Ointment, or Cold Cream (rose-water 30, expressed oil of almonds 50, spermaceti and white wax, of each 10 parts).

Extractum Rosæ Fluidum (U. S. P.).—Fluid Extract of Roses (from red roses). *Dose,* ♏v–f℥j.

Confectio Rosæ (U. S. P.).—Confection of Roses (red rose 8, sugar 64, honey 12, rose-water 16 parts).

Mel Rosæ (U. S. P.).—Honey of Roses (red rose 8, honey 92 parts, dilute alcohol q. s.).

Syrupus Rosæ (U. S. P.).—Syrup of Roses (fluid extract of red rose 10, syrup 90 parts). As a vehicle.

Pharmacology.—Red rose contains **tannic** and **gallic acids** and a **volatile oil,** which the pharmacopœia directs shall be obtained from another species. Red rose is an ingredient in the pills of aloes and mastic, and pale rose enters into the compound syrup of sarsaparilla. In the British Pharmacopœia an acid infusion of rose appears, which is an agreeable mouth-wash. It is made with dried red-rose petals, broken up, ¼ ounce; dilute sulphuric acid, 1 fluidrachm; boiling distilled water, 10 fluidounces. This preparation may be given internally, in the dose of 1 or 2 fluidounces, and is, in effect, but an agreeable method of administering sulphuric acid.

Physiological Action and Therapy.—Preparations of rose are somewhat astringent. They are used as agreeable flavoring agents and vehicles. The confection is a good base for pills. The compound infusion is of service for overcoming the bad taste of sulphate of magnesium. Aqua rosæ is a favorite vehicle for eye-washes and urethral injections, and for cosmetic preparations. Rose-water ointment is an elegant, bland unguent, principally used as an excipient, but available in superficial burns, chapped lips or hands, abrasions, and erythema.

ROSMARINUS (U. S. P.).—**Rosemary.**

Preparations.

Oleum Rosmarini (U. S. P.).—Oil of Rosemary. *Dose*, ♏i–v.

Spiritus Rosmarini.—Spirit of Rosemary (1 to 60). As a perfume. *Dose*, ♏i–v.

Pharmacology.—The leaves of Rosmarinus officinalis (Labiatæ) are aromatic, pungent, and bitter. They contain **volatile oil** (about 1 per cent.), some resin, tannin, and a bitter substance. Rosemary enters into aromatic wine (see page 413), perfumed spirit, or eau de Cologne, soap liniment, and compound tincture of lavender.

Physiological Action.—Rosemary is stimulant, diuretic, carminative, emmenagogue, and somewhat diaphoretic, but is now rarely employed in substance, the oil taking its place. The latter is stimulant and carminative. It reduces temperature, imparts a peculiar odor to the urine, and in large quantities has caused death. It is chiefly used as a rubefacient in liniments and ointments.

Therapy.—In alopecia from defective nutrition of hair-bulbs, a lotion containing oil of rosemary and tincture of cantharides, with Cologne water, is frequently given. It may also be used as a rubefacient for sprains and painful joints, and is efficacious in the different forms of pediculosis. The compound rosemary ointment of the German Pharmacopœia contains 1 part each of oil of rosemary and oil of juniper-berries in 30 parts of ointment, and is used in neuralgia, chronic rheumatism, and lumbago. The oil of rosemary is of some service as an internal remedy in hysteria accompanied by depressed spirits.

RUBUS (U. S. P.).—**Blackberry.**

Preparations.

Extractum Rubi Fluidum (U. S. P.).—Fluid Extract of Blackberry. *Dose*, fʒss.

Syrupus Rubi (U. S. P.).—Syrup of Blackberry (containing fluid extract, 20 per cent.). *Dose*, fʒj–f℥j.

Syrupus Rubi Aromaticus (N. F.).—Aromatic Blackberry-Syrup (blackberry, cinnamon, nutmeg, cloves, and allspice). *Dose*, fʒi–iv.

Elixir Rubi.—Blackberry-Cordial, Blackberry-Brandy (fluid extract blackberry-root 5, aromatic fluid extract ½, brandy 13½, syrup of blackberries 17, elixir 17 parts). *Dose*, fʒij–f℥ss.

Elixir Rubi Compositum (N. F.).—Blackberry Compound (blackberry-root, galls, and cinnamon, each 10 parts, with cloves, mace, ginger, in blackberry-juice and syrup). *Dose*, f℥j–f℥j.

Cordialis Rubi Fructus.—Blackberry-Cordial (fresh blackberry-juice 3, cinnamon, cloves, and nutmeg, in tincture with dilute alcohol, 2, simple syrup 3 parts). *Dose*, f℥j–f℥j.

Pharmacology.—The bark of the root of Rubus villosus, Rubus Canadensis, and Rubus trivialis (Rosaceæ, Dryadeæ) is officinal as Rubus. The wood should be rejected, only the bark being of medicinal value. It contains tannic acid (10 per cent.). The fluid extract is made by percolation with diluted alcohol, and contains glycerin (20 per cent.).

Physiological Action.—Blackberry is astringent.

Therapy.—In diarrhœa of relaxation, especially after cleansing the bowels with castor oil, the preparations are useful. The combinations of the fruit for the table (jams, preserves, etc.) are not astringent, and are not only useless in treating diarrhœa, but also injurious, since the hard seeds increase the irritation. The best form is the fluid extract, but there is a popular demand for blackberry-cordials and blackberry-brandy, for which formulæ are given above. They are pleasant to the taste carminative, and slightly astringent.

RUBUS IDÆUS (U. S. P.).—Raspberry.

Preparation.

Syrupus Rubi Idæi (U. S. P.).—Raspberry-Syrup. As a vehicle.

Pharmacology.—The fruit of Rubus idæus (Rosaceæ, Dryadeæ) has a pleasant flavor. It contains sugar, malic and citric acids, pectin, proteids, coloring matter, and a trace of volatile oil, consisting of compound ethers producing the peculiar flavor.

Therapy.—Its sole use in medicine is to prepare the syrup, which has a pleasant, acid taste and a fruity odor. The leaves of the wild raspberry (R. strigosus) contain tannin, and are used in decoction as an astringent in diarrhœa. Raspberry-syrup with vinegar is a grateful drink in hot weather, added to cold water.

RUMEX (U. S. P.).—Rumex, Yellow Dock.

Preparations.

Extractum Rumicis Fluidum (U. S. P.).—Fluid Extract of Rumex. *Dose*, f℥ss–j.

Decoctum Rumicis.—Decoction of Dock (fresh root, ℥ij, to water, Oj). *Dose*, f℥i–iv.

Pharmacology.—Rumex is the root of Rumex crispus, and of other species of rumex (Polygonaceæ) growing along roadsides in Europe and America. The officinal root is 8 by 12 inches long, ½ inch thick, somewhat fusiform. It contains tannin, chrysophanic acid, mucilage, calcium oxalate, starch, etc.

Physiological Action.—Dock is alterative, tonic, and slightly astringent.

Therapy.—In strumous affections, especially enlargement of the glands and cutaneous disorders, rumex has been found particularly valuable. It is also considered antiscorbutic. In chronic laryngeal affections, with cough and soreness under the sternum, it will give relief. The decoction is sometimes employed externally in various skin diseases and glandular swellings. Also used internally in dyspepsia and liver disorders.

RUTÆ OLEUM (U. S. P.).—**Oil of Rue.**

Dose, ♏ii–v.

Pharmacology.—Volatile oil distilled from Ruta graveolens (Rutaceæ, Ruteæ). Its color is light yellow, which becomes brown when the oil is long kept; the taste is sharp and bitter; the odor is aromatic, disagreeable, and distinctive. This oil is soluble in all proportions in absolute alcohol.

Physiological Action.—Applied to the skin, oil of rue occasions hyperæmia, inflammation, and vesication. In ordinary doses it is carminative, and is a general stimulant to the circulation and the secretions. Large doses cause gastro-enteritis, convulsions, stupor, dimness of vision and contracted pupils, suppression of urine or strangury. Abortion may result from toxic doses. It has some special action upon the genito-urinary tract. Rue is eliminated, and may be recognized by its odor in the breath, urine, and perspiration.

Therapy.—The oil of rue is useful in amenorrhœa due to defective excitement of the ovaries, and in passive menorrhagia of debility or following abortion. Hysteria, especially when associated with amenorrhœa, is benefited by this remedy. It has been used with success in flatulence and infantile convulsions dependent upon that condition. Used as an abortifacient, in accordance with popular reputation, it has several times caused death from irritant poisoning, as above indicated. Rue is beneficial in defective activity of the sexual organs, acting as an aphrodisiac and as an emmenagogue. The irritant properties of the oil of rue have caused it to be sometimes used as a topical remedy. It is said to have the power of destroying warts. Phillips states that the bruised leaves of rue laid upon the forehead will often check epistaxis. Rue has been added to liniments for application to the chest in chronic bronchitis.

SABADILLA.—**Cevadilla.**

Pharmacology.—The seeds of Asagræa officinalis (Melanthaceæ), of Mexico and Central America, contain **Veratrine, Cevadine,** and **Cevadilline,** combined with **Cevadic** and **Cevadillic acids.**

Physiological Action and Therapy.—An ointment has been used to destroy lice and other vermin, and as a cure for itch. The physiological effects are those of veratrine. (See Veratrina.) Cevadilla* is a powerful emetic, cathartic, and anthelmintic, and has been given in doses of 1 to 5 grains. It is seldom now used, and its principal value is as a source of veratrine.

SABAL SERRULATA.—Saw-Palmetto.

Preparation.

Extractum Sabal Fluidum.—Fluid Extract of Sabal. *Dose*, f℥ss–ij.

Pharmacology.—The Sabal serrulata, or saw-palmetto (Palmaceæ), grows abundantly along the sea-coast from South Carolina to Florida, and is found as far as 8 or 10 miles inland. This plant possesses a creeping and branched stem, leaves of a bright-green color, fan-shaped and spiculated. The roots, large and fibrous, extend several feet from the stem and are half exposed above the sand. The berries or drupes, of a dark-purple color and about the size of an olive, ripen in October and November. The seeds are very hard, and enveloped in a tough, fibrous membrane. The plant contains a volatile oil (soluble in alcohol), a fixed oil, and a large proportion of saccharine matter.

Physiological Action.—The taste, at first sweet, soon becomes acrid and pungent; to the pungent succeeds a smooth sensation, which extends from the tongue and mouth to the larynx and nasal cavities, all of which parts feel as if lubricated with oil. Saw-palmetto is said to increase appetite, digestion, and strength, and to promote nutrition. It also exerts a sedative and diuretic influence, and has been thought to have a special tonic effect upon the reproductive system. The berries seem to have nutrient value, as the animals who feed upon them rapidly fatten. The physiological action of saw-palmetto has not been systematically investigated.

Therapy.—Saw-palmetto is said to be an excellent expectorant, and, at the same time, a sedative to the mucous membranes of the respiratory tract. Troublesome nervous cough is allayed and secretion promoted by its use. This remedy has been employed with benefit in coryza, acute and chronic laryngitis and bronchitis. Bronchorrhœa with bronchiectasis is relieved by the administration of sabal serrulata. Dr. Read† states that an acute nasal catarrh may be aborted by two or three doses and that the vapor is inhaled with advantage in chronic ozæna. Sabal is claimed to possess some efficiency in cardiac asthma. On account of its combination of tonic and expectorant properties, it has been found of service in

* Two new alkaloids, Sabadine and Sabadinine, are said to have been obtained from sabadilla-seeds by Merck. Pharmaceutical Record, New York, February 19, 1891.

† "Sabal Serrulata, Saw-Palmetto," by Dr. J. B. Read, of Savannah, Georgia. American Journal of Pharmacy, April, 1879, p. 169.

phthisis pulmonalis, and especially in tuberculosis of the larynx. Saw-palmetto is thought to be valuable in atrophy of the mammæ, testicles, or uterus, and to exert a beneficial influence upon enlarged prostate.

SABBATIA.—American Centaury.

Dose, gr. xxx–ʒiss, in infusion or fluid extract.

Pharmacology and Therapy.—The entire flowering plants of Sabbatia angularis and of Sabbatia paniculata (Gentianaceæ) are used in medicine for the same purposes as gentian, columbo, and other simple bitters. A solid extract, obtained by evaporating the fluid extract and adding 5 per cent. of glycerin, may be given as a tonic in atonic dyspepsia in doses of gr. ii–xij.

SABINA (U. S. P.).—**Savin.**

Preparations.

Extractum Sabinæ Fluidum (U. S. P.).—Fluid Extract of Savin. *Dose*, ♏v–xx.
Ceratum Sabinæ (U. S. P.).—Savin Cerate (fluid extract 25, resin cerate 90 parts).
Oleum Sabinæ (U. S. P.)—Oil of Savin. *Dose*, ♏ii–v.

Pharmacology.—The tops of Juniperus sabinæ (Coniferæ), a small evergreen tree common in the northern hemisphere, often cultivated as an ornamental shrub. It contains a volatile oil, which, when separated by distillation, is officinal as oil of savin; also tannin, resin, etc. Oil of savin is colorless or yellowish, has a strong, characteristic smell and a burning taste. It is freely soluble in absolute alcohol.

Physiological Action.—Locally, savin causes rubefaction, or even vesication. Internally, it is a stimulant to the digestive organs, increases the action of the heart, and stimulates the bronchial, cutaneous, and renal secretions. It causes hyperæmia of the kidneys, of the ovaries and uterus, and, in large doses, excites strangury, hæmaturia, violent vomiting and purging, gastro-enteritis, unconsciousness, stertor, and convulsions. Savin may, as part of its toxic effects, cause abortion in a pregnant woman, and death has occasionally resulted from its irritant action when administered for this purpose. The odor of savin appears in the breath, sweat, and urine as elimination takes place.

Therapy.—Savin used to be added to blisters, or blistered surfaces were dressed with savin ointment, to increase the effect, but this practice is now obsolete. The cerate may be applied as a caustic for the destruction of warts. A mixture of powdered savin and verdigris has been successfully employed for the removal of condylomata. Powdered savin may be used as a stimulant to indolent ulcers. A cerate or ointment of savin is a serviceable counter-irritant in chronic gout or rheumatism. This drug is efficient in tinea capitis and scabies, and has been used internally with success as a tæniacide. As an emmenagogue, Phillips considers it

highly valuable and safe, in proper doses. It is used in functional dysmenorrhœa, in passive hæmorrhages after abortion, and, as Whitla suggests, may prove beneficial in subinvolution of the uterus.

SACCHARINUM.—Saccharin (Anhydro-ortho-sulphamin-benzoic acid).

Pharmacology.—Saccharin is a coal-tar derivative, discovered in Professor Remsen's laboratory of Johns Hopkins University, and first described by C. Fahlberg in a communication to the *American Chemical Journal*, 1879 (vol. i, p. 436). It is a white, crystalline powder, with an acid reaction, but an intensely sweet taste. This substance is soluble in 500 parts of cold water, readily soluble in alcohol and ether, and forms soluble salts with the hydrates or carbonates of the alkaline metals. It melts at 220° C. (428° F.), and when fused with potassic hydrate it forms salicylic acid. One part dissolved in 70,000 parts of water imparts to the solution a distinctly sweet taste; it is about 300 times sweeter than cane-sugar, which it resembles in taste, except for a peculiar slight flavor of bitter almonds.

Physiological Action.—Sachharin is excreted by the kidneys unchanged; it is not decomposed in the body, and has little if any effect upon digestion. The only noticeable effects upon the urine are that it does not so readily undergo fermentation and the chlorides are slightly increased. Pure saccharin is not possessed of toxic or deleterious effects upon the human organism, even in doses as large as 75 grains. Saccharin has considerable antiseptic virtue, which, according to Constantine Paul, is impaired when it acts in an acid medium.

Therapy.—Saccharin is chiefly employed to take the place of sugar in the diet of obese and diabetic patients. For this purpose it is best prescribed in the form of a syrup containing 10 parts of saccharin and 12 parts of bicarbonate of sodium in 1000 parts of distilled water, made with gentle heat at 40° C. (104° F.). It has also been claimed by Dreschfeld that saccharin relieves some of the symptoms of acid dyspepsia. Two parts of saccharin dissolved by means of 3 parts of the bicarbonate of sodium are said to form an excellent tooth-wash. Fournier has found a mouth-wash containing saccharin efficacious in aphthæ. Saccharin is largely used in confectionery to add to glucose and make it correspond more closely in sweetness with cane-sugar. It may be prescribed with quinine, in order to overcome the bitterness:—

℞ Quinin. sulphat., ... ʒj.
Saccharin., ... gr. xxx.

M. et div. in chartulæ no. xxx.
Sig.: Take one four times a day.

SACCHARUM (U. S. P.).—Sugar, Saccharose.

Pharmacology.—The refined sugar of Saccharum officinarum (Gramineæ), or cane-sugar, the product of the sugar-cane, grown in sub-tropical countries, is a widely used article of food. The officinal **syrup** consists of 65 parts of sugar and water q. s. ad 100 parts. Sugar is the basis of the syrups, conserves, and many other pharmaceutical preparations. With lime it forms a chemical combination,—the saccharate of calcium,—which is an **antidote to carbolic acid**; it is officinal as Syrupus Calcis, which contains 1 per cent. of lime.

Saccharum lactis (U. S. P.), sugar of milk, is a peculiar crystalline sugar obtained from the whey of cows' milk by evaporation, and purified by recrystallization. It is also known as **lactose**; cane-sugar is **saccharose,** and **glucose** is grape-sugar or starch-sugar. Sugar of milk is largely made in Switzerland from the whey remaining after making cheese. It is a white, rather gritty sugar, less sweet than saccharose, and has a neutral reaction. It is used in pharmacy as a diluent, on account of its hardness, in making triturates and abstracts. Lactose enters into Dover's powder, saccharated pepsin, denarcotized opium, and other preparations. According to Dr. Brush, it is very commonly adulterated.

SAGO.—Sago.

Pharmacology.—Sago is a prepared starch from the interior of the stem of Metroxylon sagu or Sagus Rumphii (Palmaceæ) of the Indian Archipelago. It occurs in hard, whitish, spherical grains, which form a gelatinous mass with boiling water. Pearl sago is the best variety. An imitation sago is made from potatoes.

Therapy.—It is useful as an easily digested and acceptable article of food for the sick when added to broth, or in the form of light puddings.

SAL-BROMALIDE (Salicylanilide-Bromacetanilide).

Dose, gr. v–viij.

Pharmacology.—A combination of acetanilide, salicylic acid, and bromine, with the formula $C_5H_5NH[C_6H_4(OH)(CO)] + C_6H_4Br.NH.CH_3CO$, has been recently introduced by Dr. S. Radlauer, of Berlin. It is a white, crystalline, granular powder, without odor, and almost tasteless. This substance is soluble in alcohol, dilute alcohol, and hot water, and almost insoluble in cold water; it is more soluble in water slightly acidulated with hydrochloric acid or in dilute solution of caustic potassa.

Physiological Action and Therapy.—Its physiological action is similar to that of other remedies of this class; it is antiseptic, antipyretic, and hypnotic. It resembles antipyrin in its effects upon the sensory nerves. Woodbury has used it clinically (1) to relieve pain; (2) to produce

sleep; (3) to allay spasmodic cough; (4) to reduce fever; (5) to arrest fermentation in infectious dyspepsia. In the small doses usually given (gr. v–viij), it relieves headache and restlessness and produces natural sleep. It has not so much influence over high temperature as some of the other remedies of this class, but it does not produce sweating or cyanosis. In the treatment of influenza, or grippe, this salt reduces the fever and allays pain and restlessness. Where cough becomes spasmodic and paroxysmal, the sal-bromalide exercises a sedative effect and produces sleep. It is of advantage in whooping-cough (gr. i–ij every two hours) or in asthma, whether of cardiac or bronchial origin. It has been used in Germany, with successful results, in diabetes, reducing both the sugar and the amount of urine; and it is stated to be particularly serviceable in acute articular rheumatism.

SALEP.—Salep.

Pharmacology and Therapy.—The tubers of several species of Orchis (Orchidaceæ, Ophrydeæ) growing in Germany and France, collected in the autumn, deprived of epidermis and dried. They contain **bassorin** (48 per cent.), or vegetable mucilage, and **starch** (27 per cent.). With forty times its weight of boiling water, salep forms a thick jelly, which can be flavored and used as a nutritious article of food during convalescence from acute diseases and in bowel disorders.

SALIX (U. S. P.).—**Willow, Willow-Bark.**

Dose, ℥j, or more, in infusion.

Preparations.

Salicinum (U. S. P.).—Salicin. *Dose*, gr. x–ʒij.
Salol.—Phenol Salicylate. *Dose*, gr. iii–ʒj.

Pharmacology.—The bark of Salix alba (Salicaceæ) and of other species of salix are officinal under this title. The most important constituents are **Salicin**, a neutral principle, in white, silky crystals, of very bitter taste, and **tannic acid.** Salicin is a crystalline glucoside, which, by fusing with potassium hydrate, yields oxalic and salicylic acids. Salicylic acid and the salicylates of sodium, lithium, and of physostigmine are also officinal. (See page 386.) The oil of gaultheria, or of birch, also contains salicin as methyl-salicylate, and may be used to obtain salicylic acid, which may also be made synthetically by combining phenol with carbon dioxide (Kolbe and Lautemann).

Physiological Action.—The bark is an astringent bitter toxic and antiperiodic. One variety, the **Salix nigra,** is considered a diuretic and sexual sedative, the fluid extract being used in doses of ♏xx–xxx several times a day. Salicin acts as a bitter tonic, with antiperiodic and antiseptic powers. It is not toxic in the human subject, and is acceptable

to the stomach. This agent is excreted mainly as salicyluric, salicylous, and salicylic acids by the kidneys. Salicylic acid has already been considered. (Page 386.)

Therapy.—Salicin is a useful, bitter tonic, in feeble digestion, in doses of 2 to 5 grains. In the diarrhœa of phthisis it is effective in restoring a more healthy condition and promoting digestion, and it also reduces the fever, given in doses of 20 grains, two or three times daily:—

℞ Salicin.,
Bismuth. subnit., ... gr. c.
Ol. cinnamomi, ... ♏j.
M. et ft. capsulæ no. xx.
Sig.: One or two capsules every hour or two for diarrhœa.

Salicin is a beneficial remedy in the chronic diarrhœa of children. In acute rheumatism, Maclagan considers it safer than salicylic acid, as it does not depress the heart, the dose being from 10 to 50 grains every three or four hours; or, in order to get the full antipyretic effect, these doses may be administered every hour until two or three are taken, and then less frequently. He also commends its use in neuralgia and coryza. In full doses its antipyretic effect may be accompanied by free perspiration, but it is not toxic, and can be given in amounts of several drachms daily.

SALOL.

Dose, gr. v–ʒj.

Pharmacology.—The combination of salicylic acid and phenol—the phenylic ether of salicylic acid—is sold under the trade name of salol. It consists of 60 parts by weight of the former and 40 of the latter. Salol is a white, crystalline powder, insoluble in water, odorless, and almost tasteless. It was first prepared by von Nencki in 1883, and introduced into practice in 1886 by Sahli. In the organism it becomes decomposed, yielding salicylic acid and carbolic acid in nascent form. It is antiseptic, germicide, and antipyretic to a more marked degree, and is proportionately less toxic than either of its constituents.

Physiological Action and Therapy.—It must not be forgotten that in administering salol internally the therapeutic effect is due to the salicylic acid and carbolic acid, and therefore that large doses cannot be given with impunity for fear of phenol poisoning. Salol is absorbed slowly and eliminated slowly, so that there is danger of accumulation in the system if given too frequently, except where diarrhœa is present. Josefowitsch reports the case of a man, 40 years of age, to whom 350 grains had been given in the course of four days, who suffered with intense albuminuria and violent pains in the loins. Black urine (carboluria) may continue for

some time after its ingestion. Kobert insists that, from the large proportion of phenol which salol contains, it is, comparatively speaking, a toxic substance; so that any exceeding of the maximum dose must be regarded as hazardous. Dr. Hesselbach reports the case of a woman who died after taking 120 grains of salol within eight hours. It was found that she had been suffering with chronic nephritis, which was made acute by the drug. Dr. Hesselbach, from his study of the action of the agent, concludes that the large proportion of phenol contained in salol renders it such a toxic substance that its unrestricted therapeutic use is fraught with danger; and, secondly, that in renal disease, acute or chronic, salol is contra-indicated.*

Salol is an excellent dressing for wounds, burns, ulcers, erysipelas, and other cutaneous disorders. A camphorated salol is highly esteemed by Cuirllier in the treatment of suppurative otitis. The meatus is first cleansed by means of a solution of boric acid, and the camphorated salol applied upon a tampon of wool, which is left in position not more than twenty-four hours.†

In fermentative disorders of the stomach (dilated stomach especially), in intestinal dyspepsia, salol, in 2- to 5-grain doses, is remarkably effective in relieving the annoying symptoms of flatulence, pyrosis, pain, sick headache, etc. In duodenal catarrh, or catarrh of the bile-ducts, with or without jaundice, good results are obtained from salol. This substance is of value in diarrhœa, and is strongly recommended by Moncorvo, of Rio Janeiro, in the malarial diarrhœa of children.

The following prescriptions containing salol are useful:—

℞ Salolis, ... ʒij.
Pulv. ipecacuanhæ et opii, ... gr. xxiv.
M. et ft. chartæ no. xxij.
Sig.: A powder every hour or two until relieved of diarrhœa.

℞ Salolis,
Bismuth. subnit.,
Cretæ præparatæ,. . . . . āā ʒj.
M. et ft. chartæ no. xij.
Sig.: A powder every hour or two, for diarrhœa.

Dr. W. L. Carr has found it of decided service in the first stage of acute gastro-enteritis, and, being excreted as salicylic acid, it acts as a disinfectant to the urinary passages, and is useful in pyelitis, catarrh of the bladder, and ammoniacal urine. Dr. S. L. Abbott treated three cases of cystitis in women with salol (gr. x thrice daily or gr. v every three hours). Under its use the symptoms disappeared and the urine

* "The Action of Salol on the Kidneys," Therapeutic Gazette, October, 1890, p. 704.
† American Journal of Pharmacy, January, 1891.

became acid, and the patients were cured after the failure of other remedies.

Recently M. Heiz reported twenty cases of blennorrhagia treated by salol, in which the disease lasted only ten or twelve days. In the same communication * he praises it highly in typhoid fever, giving it in doses of a drachm daily, combined with salicylate of bismuth. Salol is especially valuable in the treatment of acute rheumatism, given in 15- to 30-grain doses three or four times daily. It reduces the temperature and causes free perspiration, and is somewhat analgesic.

M. Gouguenheim † says that salol has a very manifest action in suppurative sore throat (tonsillitis, etc.). Salol is valuable as an intestinal and urinary antiseptic. It is especially serviceable in cystitis, enlarged and irritable prostate, gonorrhœa, and gleet. In the treatment of diseases of the genito-urinary tract, salol can be prescribed as follows :—

℞ Salolis, ... gr. c.
Terebenæ, ... ℳc.

M. et ft. capsulæ no. xx.

Sig. : A capsule or two every two or three hours. For irritation of the genital organs. Valuable especially in gleet.

The following have also proved of service in gonorrhœa and gleet:—

℞ Salolis, ... gr. c.
Ext. belladonnæ alc., ... gr. ij.

M. et ft. capsulæ no. xx.

Sig. : From four to six capsules a day.

℞ Salolis, ... gr. c.
Ergotinæ, ... gr. xx.

M. et ft. capsulæ no. xx.

Sig. : One or two capsules every two or three hours. For cystitis and in enlarged prostate.

Dr. J. William White ‡ recommends salol given in capsules as follows in the treatment of recent anterior urethritis :—

℞ Salolis, ... gr. iiiss.
Oleoresin. cubebæ, ... gr. v.
Balsam. copaibæ (Para), ... gr. x.
Pepsinæ, ... gr. j.

M. et ft. capsulæ no. j. Mitte no. xxx.

Sig. : One capsule four to six times daily.

This writer reports that the discharge thus treated in two-thirds of the cases ceased within a week. In the majority of patients he also

* Repertoire de Pharmacie, July 10, 1890.
† La Tribune Médicale ; also Medical Mirror, December, 1870.
‡ The Philadelphia Medical News, June 14, 1890.

recommended an injection of gr. ij of sulphocarbolate of zinc in a 10- to 15-per-cent. solution of peroxide of hydrogen.

Salipyrin is a combination of salicylic acid and antipyrin. This substance can be made by gradually adding 73.4 parts of salicylic acid to a boiling aqueous solution of 100 parts of antipyrin. On cooling, salicylate of antipyrin is thrown down in the form of colorless, transparent crystals or scales, which are very slightly soluble in cold water, but readily soluble in alcohol, ether, or chloroform. Salipyrin is used by Guttmann in doses of a drachm or more in twenty-four hours, given in doses of 15 grains, the first dose to be double (30 grains). It has decided antipyretic and analgesic action, and is especially useful in the pyrexia of rheumatism and intermittent fevers.

Salinaphthol is a combination of salicylic acid with naphthol, analogous to salol. It is given in doses of gr. iii–viij, is insoluble in water, and devoid of taste and smell.

For the physiological action of Salinaphthol, see page 762.

Salinaphthol seems less objectionable than salol, because the naphthol resulting from its decomposition is less poisonous than the phenol liberated by the latter; but thus far clinical evidence has not sufficiently accumulated to declare that it should in all cases be preferred to salol, which has been given in much larger doses.

Salophen is a new combination, which crystallizes in fine, white scales, is almost insoluble in water, readily soluble in alcohol and ether, and destitute of taste or odor. It contains 51 per cent. of salicylic acid. Upon being heated with soda-lye, it is split up into salicylate of sodium and acetyl-para-amidophenol. This decomposition takes place also within the organism. It can be administered to animals in the average quantity of 3 grains to the pound of body-weight. Salophen can be safely given to men, according to the investigations of P. Guttmann, in daily doses of 1½ to 2 drachms. Guttmann found it to have a favorable action in acute rheumatism, in some instances diminishing pain and swelling within a few days. Other cases, however, demanded weeks and months for their cure. It is unable to prevent relapse or extension to previously unaffected articulations. The antipyretic power of salophen is but slight. In typhoid fever from 1 to 1½ drachms is needed in order to reduce the temperature 1° to 1½° C. In phthisis the exhibition of 45 to 60 grains causes a reduction. Salophen is less beneficial in chronic articular rheumatism. In two cases of cystitis Dr. Guttmann saw no improvement. It produced a good result in one case of sciatica, while in a second it was without effect. It was employed in two cases of trifacial neuralgia, on one of which it made but a transient impression.*

* Deutsche Medicinal Zeitung, December 10, 1891.

SALVIA (U. S. P.).—**Sage.**

Dose, gr. x–xxx, in infusion or fluid extract (with dilute alcohol).

Pharmacology.—The leaves of Salvia officinalis (Labiatæ), a garden herb, used for its flavor in cooking; but the wild sage (Italian sage) is better for medicinal purposes. It contains from ½ to ¾ per cent. of volatile oil, **Salviol,** with tannin, resin, etc.

Physiological Action.—The infusion (℥iv to Oj), of which the dose is from an ounce to a wineglassful, is tonic, astringent, and stimulant. The latter quality is increased in the fluid extract by the diluted alcohol, used as a menstruum.

Therapy.—Infusion of sage by itself is a very good gargle and astringent wash for the nose or mouth. Internally it has been administered for its tonic effects in fevers, and to check sweating, especially in phthisis pulmonalis. Sage may be combined with other remedies as an injection for urethritis or vesical catarrh. The compound sage-gargle consists of:—

℞ Aluminis, ...	ʒiv.
Salviæ, ...	℥j.
Mel despumatæ, ...	f℥ij.
Aquæ bullientis, ...	Oj.

Ft. infusum et cola.

Sig.: Dilute with water and use as a gargle.

SAMBUCUS (U. S. P.).—**Elder-Flowers.**

Dose, ʒss–j, in infusion, drunk while hot.

Pharmacology and Therapy.—The flowers of Sambucus Canadensis (Caprifoliaceæ), of North America, are stimulant and diaphoretic, and, to some extent, diuretic. The flowers are used for flavoring purposes. They contain a small proportion of a volatile oil, which has the odor of the flowers in a high degree; also valerianic acid, acrid resin, and mucilage. Elder-flower water is a good vehicle for lotions and eye-washes. In hot infusion the remedy acts as a stimulant, diuretic, and diaphoretic, and may be emetic if given in too large quantity. The berries are edible, and the juice is considered antiscorbutic and alterative; it is used in rheumatism and syphilis. Elder-berry jam or conserve is laxative. The inner bark of elder is cathartic and, in large doses, emetic.

SANGUINARIA (U. S. P.).—**Blood-Root.**

Dose, gr. ii–xx.

Preparations.

Acetum Sanguinariæ (U. S. P.).—Vinegar of Sanguinaria. *Dose,* ♏xv–xl (or as an emetic, f ʒi–v).

Tinctura Sanguinariæ (U. S. P.).—Tincture of Sanguinaria (15 per cent.). *Dose,* ♏x–fʒj.

Extractum Sanguinariæ Fluidum (U. S. P.).—Fluid Extract of Sanguinaria. *Dose,* ♏v–xv.

Pharmacology.—The rhizome of Sanguinaria Canadensis (Papaveraceæ), collected in autumn, is about 2 inches long, cylindrical, reddish brown, containing small, red resin-cells; taste, very bitter and acrid. It contains three alkaloids, **Sanguinarine, Porphyroxine,** and **Puccine,** with **chelidonic** and **puccinic** acids.

Physiological Action.—The powder is extremely irritating to the air-passages, causing violent sneezing and free secretion. It is a feeble escharotic. The taste is harsh and bitter. Taken internally, it is a systemic emetic, its action being followed by salivation and much depression, causing also an increase of hepatic secretion. Sanguinaria may cause hypercatharsis and act as an irritant, acro-narcotic poison. It is emmenagogue and expectorant, and, after a preliminary increase of arterial tension, depresses the heart's action; death is produced by paralysis of the medullary, respiratory, and cardiac centres. The spinal reflexes are reduced and spinal centres finally paralyzed; the pupils become dilated, the muscles relaxed, the skin cold and clammy, with collapse of the vital powers; the fatal result often is preceded by convulsions, either of spinal origin or arising from carbonic-acid poisoning, due to failure of respiration.

Antidotes.—The antidotes are diffusible stimulants,—digitalis, nitrite of amyl, strychnine hypodermatically, with morphine and atropine, if necessary, to relieve pain or severe nausea. The patient should be kept warm, and warm water may be used to wash out the stomach and bowels.

Therapy.—Blood-root has been used in powder as an application to ulcerated surfaces, and is regarded by some as a cure for cancer; but it is painful, and, if freely applied, may be absorbed and cause vomiting and other symptoms of poisoning. Keyser employs nitrate of sanguinarine (Merck's) ¼ grain, with 1 ounce of glycerin, as a remedy for conjunctivitis granulosa. Powdered sanguinaria, snuffed or blown into the nose, is said to cure polypi, and may prove successful. A decoction may be used with advantage as a gargle in the scarlatinal angina. An ointment containing blood-root has been successfully used in tinea. The powdered root is recommended by some as a sternutatory in nasal catarrh, and the treatment is certainly very effective, because the patient will not be likely to return for further treatment. The conjoined internal use of the tincture, dose 10 minims, thrice daily, is also advised. In small doses of the tincture (5 or 10 minims several times a day), it is considered valuable in atonic dyspepsia, gastric catarrh, or duodenal catarrh with jaundice. Large doses, a teaspoonful to a tablespoonful of the vinegar, or the tincture, causes vomiting, with increase of hepatic secretion. It has been used in croup as an emetic, but is too violent and too depressing.

In various spasmodic affections and disorders, accompanied by cough,

as in pneumonia, asthma, bronchitis, etc., small doses of the tincture may be given at short intervals. Sanguinaria may be prescribed thus with expectorants for the diseases referred to :—

℞ Tinct. sanguinariæ, ... fʒj.
Syrupi ipecac., ... f℥ss.
Tinct. lobeliæ, ... fʒj.
Glycerini, ... f℥ss.

M. Sig.: A teaspoonful every two or three hours, for subacute bronchitis.

℞ Tinct. sanguinariæ, ... fʒij.
Ammonii bromidi, ... ʒiij.
Spiritus ætheris nitrosi, ... f℥j.
Syrup. pruni Virg., ... q. s. ad f℥v.

M. Sig.: Two teaspoonfuls in water every two or three hours, for asthma and in bronchitis.

Sanguinarine may be given as an expectorant in doses of gr. $\frac{1}{12}$–$\frac{1}{8}$ in pneumonia, bronchial catarrh, winter cough, etc., the alkaloid having the advantage of not disturbing the stomach, although its secretions are increased by fractional doses. A syrup of sanguinaria, made by adding sugar to the vinegar, may be used as an ingredient in cough mixtures (♏v–xv) or as an emetic (fʒi–ij).

In hysteria, due to pain or moral causes, sanguinaria is said to be sometimes of advantage, either given alone or in combination with podophyllum.* For various functional affections of the genital system, amenorrhœa, dysmenorrhœa, and in impotence, with seminal incontinence and relaxation of the organs, sanguinaria is pronounced a serviceable remedy. Blood-root can be combined as follows, for the diseases named :—

℞ Tinct. sanguinariæ,
Ext. hoang-nan fl.,
Ext. ergotæ fl., ... āā fʒij.

M. Sig.: Twenty to forty drops in water three times a day, in amenorrhœa ; useful also in impotence and seminal weakness.

℞ Sanguinariæ, ... gr. ij.
Aloini,
Abst. ignatiæ, ... āā gr. ij.
Ferri lactatis, ... gr. xx.

M. et ft. pil. no. xx.
Sig.: A pill three or four times a day ; beneficial as an emmenagogue and in genital debility.

Sanguinaria is also regarded as an alterative, on account of its influence upon secretions, and may be used in syphilis, especially of the skin.

* Phillips, *op. cit.*

SANTALI OLEUM (U. S. P.).—**Oil of Sandal-Wood.**

Dose, ♏v–x; in emulsion or capsules.

Pharmacology.—A volatile oil distilled from the wood of Santalum album (Santalaceæ), of India. It is a pale-yellowish or yellow liquid, of a peculiar, strongly-aromatic odor, a pungent and spicy taste, and slightly-acid reaction. It is readily soluble in alcohol, ether, and chloroform, and is used in perfumery.

Physiological Action.—Sandal-wood-oil acts as an internal antiseptic and as an astringent to mucous surfaces, checking secretions and causing dryness of the throat and thirst. It is largely excreted by the kidneys and imparts an odor to the urine, to which it gives also medicinal qualities, so that it acts upon the urinary passages. Absorption and elimination are very rapid, and it may be detected in the urine half an hour after administration. This oil partly escapes by the broncho-pulmonary mucous membrane, and here also exerts a local effect.

Therapy.—Sandal-wood-oil is used principally in the treatment of gonorrhœa, even in the acute stage, given in capsules of 5 minims each, one or two, three times daily. It seems to be best adapted to plethoric individuals, with abundant discharge. It generally relieves the pain and discharge within four or five days. If the discharge is not materially diminished within ten days the doses should be cautiously increased. The use of the oil is not contra-indicated by the presence of any of the complications of the disease. It is also valuable in pyelitis, cystitis, gleet, urethral hæmorrhage, and chronic bronchial catarrh. It is important to note that much of the oil of sandal-wood, especially in the form of proprietary capsules, is impure, and is adulterated with other oils. The French preparation, known as Santal-Midy, prepared by Midy's process from freshly-felled Mysore sandal-wood, is a reliable preparation, put up in capsules of 5 drops each in the laboratory of Rigaud and Chapoteaut, Paris. The leading manufacturers of soft capsules in this country, Messrs. Parke, Davis & Co., also employ an oil of good quality and therapeutical activity. The advantage of pure oil of sandal-wood over copaiba and cubeb is that it does not nauseate or disturb digestion, and can be given with good results during the inflammatory stages of blennorrhœa or cystitis. The fluid extract, obtained from the S. citrinum, or yellow sandal-wood, has been used for the same purposes as the oil. The wood is largely used as an ingredient of incense, in China, in temple-worship, and is prized for its perfume.

SANTALUM RUBRUM (U. S. P.).—**Red Saunders.**

Pharmacology.—The wood of Pterocarpus santalinus (Leguminosæ, Papilionaceæ) usually is met with in the shops as raspings. It contains

a red coloring matter of a resinous character, known as **Santalic acid,** which is soluble in alcohol, but insoluble in water. It is used in pharmacy for coloring alcoholic liquors or tinctures red. It enters into the compound tincture of lavender.

SANTONICA (U. S. P.).—**Santonica, Levant** or **German Wormseed. Dose,** ʒss–j.

Preparations.

Extractum Santonicæ.—Extract of Santonica. *Dose*, gr. ii–viij.

Extractum Santonicæ Fluidum.—Fluid Extract of Santonica. *Dose*, ♏viii–xxx.

Santoninum (U. S. P.).—Santonin, Santoninic Acid. *Dose*, gr. i–iv.

Sodii Santoninas (U. S. P.).—Santoninate of Sodium. *Dose*, gr. v–x.

Trochisci Sodii Santoninatis (U. S. P.).—Troches of Santoninate of Sodium (each containing 1 grain of the soda salt). *Dose*, i–v.

Trochisci Santonini.—Troches of Santonin, Worm Lozenges (each gr. ss). *Dose*, i–v.

Pharmacology.—The unexpanded flower-heads of Artemisia maritima, var. Stechmanniana (Compositæ), growing in Turkestan and surrounding countries, are generally known as wormseed. They contain about 1 per cent. of volatile oil and from $\frac{1}{2}$ to 2 per cent. of **Santonin,** a peculiar, crystalline principle, with faintly-acid properties, forming salts with alkalies, of which the sodium salt is officinal. As the object of administration of this remedy is to act locally upon the parasites of the digestive tract, it is better to employ the slightly-soluble santonin than its more soluble combination. The troches, therefore, made with santonin, instead of the santoninate of sodium, are better, because less likely to occasion toxic effects.

Physiological Action and Therapy.—Santonin is a very popular vermifuge against the round-worm, **Ascaris lumbricoides,** and, to a less extent, against the thread-worm, **Oxyuris vermicularis.** It has no effect upon the tape-worm. The crystals of santonin and its officinal salt are colorless, but turn yellow upon exposure to light. When taken into the body, this change occurs in the blood, which disturbs the nutrition of the cerebral centres, so that chromatopsia is produced, the patient complaining that everything has a lurid, yellow, or greenish tinge, and he may even entirely lose his vision for a few days. The urine is stained a greenish-yellow, or, if it should be alkaline, it has a reddish-purple color. This is due to **xanthopsin,** a derivative of santonin. Elimination, which takes place by the kidneys, is slow, about two days being required for the removal of an ordinary dose. The flow of urine is considerably increased, and the calls for micturition are frequent. Acute poisoning sometimes occasioned by children eating worm-candy, or lozenges, is manifested by cerebral and digestive disorder and muscular prostration, with tremors, or even convulsions. Death occurs from respiratory

failure. Urticaria has been caused by its prolonged administration. It should be given cautiously to feeble children, and be followed in a few hours by a dose of magnesia or rhubarb. Some practitioners prefer to administer santonin with castor-oil, and, in the experience of Dr. Whitla, this combination is of decided value in diminishing the danger of any ill effects. The treatment of poisoning is by diffusible stimulants, a hot bath, demulcent drinks, belladonna, and strychnia, with ether to control convulsions.

In case children show symptoms of intestinal irritation, suggesting the presence of worms, their passages should be watched in order to detect the presence of parasites, and this may be assisted by a saline purgative, such as magnesia, or rhubarb and magnesia, which removes the mucus in which worms breed. Then a dose of santonin should be given at night and followed by a purgative in the morning.

℞ Santonini, ... gr. iij.
Hydrarg. chloridi mitis, ... gr. vj.
Sodii bicarb., ... gr. xij.
M. et div. in chart. no. vj.
Sig.: Give one each night to a child 6 years old.

Rex* gives the following prescription, containing santonin, for lumbricoid worms:—

℞ Santonini, ... gr. viij.
Ext. spigeliæ et sennæ fluid., ... f℥j.
M. Sig.: One teaspoonful three times a day.

In color-blindness, santonin has been tried with asserted success, but is probably of no service in the congenital form, though it might be serviceable where vision had been impaired or the appreciation of color lost by accident or disease. It has been advocated as a remedy for some disorders of the optic nerve, but without clinical evidence to support the suggestion. Nocturnal enuresis occasionally yields to santonin after the failure of other remedies. By Mr. Whitehead, of Manchester, santonin is recommended in amenorrhœa, especially when that condition is dependent upon chloro-anæmia. He gives a 10-grain dose on two successive nights.

Santoninoxime (obtained by heating 5 parts of santonin with 4 parts of hydrochlorate of hydroxylamine and 3 or 4 parts of lime in the presence of alcohol) is in the form of white, silky, needle-shaped crystals, insoluble in cold water, slightly soluble in boiling water, soluble in alcohol and acetic acid; it has been brought out recently as a substitute for santonin. It is claimed that this substance may be administered in doses two or three times as large as santonin, and without producing ill effects.†

* The College and Clinical Record, February, 1891.
† Répertoire de Pharmacie, 1890; Journal de Méd. de Paris, November 16, 1890.

SAPO (U. S. P.).—**Soap.** Soap prepared from soda and olive-oil.

SAPO VIRIDIS (U. S. P.).—**Green Soap.** Soap prepared from potassa and fixed oils.

Preparations.

Emplastrum Saponis (U. S. P.).—Soap Plaster (soap 10, lead plaster 90 parts).

Linimentum Saponis (U. S. P.).—Soap Liniment (soap 10, camphor 5, oil of rosemary 1, alcohol 70, water q. s. ad 100 parts).

Tinctura Saponis Viridis (U. S. P.).—Tincture of Green Soap* (green soap 65, oil of lavender 2, alcohol q. s. ad 100 parts). For external use.

Tinctura Saponis Viridis Composita (N. F.).—Compound Tincture of Green Soap (contains green soap, 15 per cent.; oil of cade, 2 per cent.). For external use.

Pharmacology.—Soap may be either hard or soft. The combination of soda and fatty acids makes a hard soap; potassa makes a soft or jelly-like soap. The latter is officinal as green soap, although it is generally brownish yellow rather than green. The sapo mollis, or soft soap, of the British Pharmacopœia, is made with olive-oil with an excess of potassa. Even hard soap usually retains considerable water when cut into bars, and, as this afterward evaporates, the soap shrinks, becomes wrinkled, and increases in hardness so that it may be powdered. Old Castile soap is a good excipient for pills, especially cathartic masses, and enters into compound extract of colocynth, pills of asafœtida, of aloes and asafœtida, of opium, and of rhubarb, compound pills of rhubarb, and compound pills of squill. Nearly all soaps are palmitates or oleates of sodium or potassium, or a combination of them. These fatty acids may also combine with other bases, as in the lead-soap, **emplastrum plumbi,** and lime-soap, **linimentum calcis.** Soap also enters into chloroform liniment.

Physiological Action.—Soap is a useful detergent, removing fat from the skin, together with dirt, foreign matter, bacteria, and epithelial scales. In antiseptic surgery the field of operation is usually first washed with soap and water and afterward with disinfectants. Taken internally, soap is a laxative and is an antidote to acid and corrosive poisoning. In the form of soap plaster, it is a good protective for the prevention of bed-sores. Applied to raw surfaces, soap augments secretions and keeps up discharge; soap and brown sugar form a stimulating dressing. Soap acts as an alkali internally and affords relief in cystitis, and was formerly vaunted as a specific for stone in the bladder, but it has been proven that this claim was not well founded. Suppositories made with soap and glycerin are very convenient for the purpose of unloading the rectum, and small suppositories of soap will relieve infantile constipation. In the treatment of diseases of the skin, the author has witnessed signal benefit from the judicious employment of medicated hard soap. It is prudent to begin its use upon a small area, and, if it prove beneficial, it

* Also known as Spiritus Saponis Kalinus of Hebra.

can afterward be applied to the whole of the affected area. In some instances medicated soap can be profitably used every day; in others, two or three times a week, or even less frequently. Numerous active drugs have been incorporated in soda-soap.* Among these may be enumerated boro-glyceride, carbolic acid, eucalyptol, naphthol, salicylic acid, corrosive sublimate, tar, etc. Most medicated soaps are made of 10-per-cent. strength. Some of the more active substances, as carbolic acid, eucalyptol, salicylic acid, are usually but half this strength, while 1 per cent. of corrosive sublimate is a sufficient proportion. Green soap is more decidedly alkaline, and exerts a softening effect on the tissues, on account of the excess of potassa which it contains. Its preparations are not used internally.

Therapy.—Powdered soap is an ingredient in some kinds of dentifrices and undoubtedly helps to preserve the teeth. As an ingredient in cathartic pills, it prevents griping and is useful in ordinary constipation:—

℞ Res. podophylli, ... gr. ij.
Ext. belladonnæ alc., ... gr. j.
Saponis, ... gr. xxx.
Ol. cajuputi, ... ♏iv.
M. et div. in pil. no. xij.
Sig.: Take one or two at bed-time, as a laxative.

Soap-suds, made by rubbing soap in hot water, form a convenient enema for unloading the bowels; a couple of pints or more may be used, to which some castor-oil or oil of turpentine may be added. Green soap is useful in chronic induration of the skin, especially in the form of the officinal tincture, which is Hebra's spiritus saponis kalinus, and may be diluted with Cologne water (1 to 3). It is useful as a cleansing agent for the scalp in seborrhœa. In sprains, rheumatic stiffness and pains, the liniment is very useful, and may have anodynes, like aconite, chloroform, or laudanum added to it:—

℞ Chloral. hydrat., ... ʒij.
Lin. saponis, ... f℥v.
M. Sig.: Use with friction in rheumatic pains.

The green soap is used in chronic eczema, the best form being the officinal tincture, which is well rubbed into the affected area and followed by a soothing application. In psoriasis, if there be much itching, we may use the following:—

℞ Saponis viridis,
Olei cadini,
Alcoholis, ... āā f℥j.
M. Sig.: Rub, every day or two, firmly into the patches, previously denuded of scales.

* For a list of medicated soaps, with a description of their composition and indications, see author's treatise on Diseases of the Skin, *loc. cit.*, p. 606.

Liveing recommends the following :—

℞ Saponis viridis,	f℥j.
Alcoholis,	f℥iss.
Aquæ,	f℥iii–vj.
Solve cola et adde	
Ol. lavandulæ florum,	♏xx.

M. Sig.: To be rubbed in at suitable intervals and allowed to dry on, preferably at night, in chronic psoriasis, acne, tinea, and sometimes lupus.*

Kappesser, Senator, and others have found soft soap a useful application to enlarged glands, whether of simple inflammatory, scrofulous, or syphilitic origin. Other scrofulous or tuberculous manifestations, as disease of the mesenteric glands, periostitis, or caries, have been benefited by the same topical treatment. The same remark may be made concerning exudations into serous cavities.

A caution should be given with regard to the use of soap upon delicate skins, especially in infants. Most toilet-soaps are too alkaline, and may contain irritating essential oils. Moreover, many cheap soaps are made with animal fat which has not been properly purified, and therefore they contain the bacteria of putrefaction and perhaps of disease. That vegetable-oil soap is preferable is acknowledged by the pharmacopœia, which requires it to be made with olive-oil. This is also called Castile soap, which may be either white or colored, the former being preferred. A good cottonseed-oil soap for the toilet or household is made by the Cotton Seed Oil Product Company. A pure glycerin soap is probably the best for the skin, it having been made transparent by dissolving it in alcohol, which is afterward driven off by heat.

SAPONARIA.—Soapwort-Root.

Dose, ʒss–iss, in infusion, several times daily.

Pharmacology and Physiological Action.—The root of Saponaria officinalis (Caryophyllaceæ), of Europe and America, contains **Saponin,** resin, and other vegetable principles. It resembles senega, sarsaparilla, quillaya, and other drugs containing saponin, in making a soapy emulsion with water, and as an expectorant, but is not used in medicine at present. In the arts, it is largely employed for washing silk, etc.

Therapy.—The smaller roots are to be preferred for making the infusion, which may be used in chronic cutaneous diseases, rheumatism, gout, and bronchial catarrh. About an ounce and a half of the drug may be employed in this way in the course of twenty-four hours.

SAPONINUM.—Saponin.

Pharmacology.—Saponin is a vegetable, active principle, a glucoside, found in caulophyllum, quillaya, saponaria, senega, and other plants. In

* Materia Medica and Therapeutics, p. 442. Phillips, 1886.

watery solution, it acts like soap, making a froth when the solution is shaken up, and forming emulsions. (See Quillaia, page 853.)

Physiological Action.—Saponin is a local irritant; also an anæsthetic and muscular poison. It causes pain when injected hypodermatically, and excites the air-passages and causes sneezing if applied to the nose. Locally applied, it paralyzes both sensory and motor nerves, producing local paralysis with anæsthesia and stiffness of the muscles. It counteracts the effects of digitalis upon the heart. Saponin also paralyzes the respiratory and vasomotor centres, and after large doses respiration fails before the heart ceases to beat. If injected into a vein, death follows from cardiac paralysis.

Therapy.—In aortic disease with hypertrophy, Brunton suggests the employment of quillaya for the saponin which it contains. Saponin may also be used, in small doses, as an expectorant in chronic bronchitis. Senegin, which is probably identical, has been administered in 2-grain doses to check uterine hæmorrhage. Saponin might be useful in snake-bite, and in other affections for which senega has been recommended, as snake-root is thought to owe its activity to this active principle.

SARSAPARILLA (U. S. P.).—Sarsaparilla.

Preparations.

Extractum Sarsaparillæ Fluidum (U. S. P.).—Fluid Extract of Sarsaparilla. *Dose*, f℥ss–ij.

Extractum Sarsaparillæ Compositum Fluidum (U. S. P.).—Compound Fluid Extract of Sarsaparilla (sarsaparilla 75, glycyrrhiza 12, sassafras-bark 10, mezereum 3, glycerin 10, alcohol and water, of each q. s. ad 100 parts). *Dose*, f℥ss–j.

Decoctum Sarsaparillæ Compositum (U. S. P.).—Compound Decoction of Sarsaparilla (sarsaparilla 10, sassafras, guaiac-wood, and liquorice-root, of each 2, mezereon 1, water q. s. ad 100 parts). *Dose*, f℥i–iv.

Syrupus Sarsaparillæ Compositus (U. S. P.).—Compound Syrup of Sarsaparilla (sarsaparilla 150, guaiacum-wood 20, pale rose 12, liquorice-root 12, senna 12, sassafras 6, anise 6, gaultheria 6, sugar 600, diluted alcohol and water ad 1000 parts). *Dose*, f℥ss–℥ss.

Extractum Sarsaparillæ.—Extract of Sarsaparilla (made from fluid extract by evaporation). *Dose*, gr. v–xxx.

Pharmacology.—The roots of Smilax officinalis, S. medica, and of other undetermined species of Smilax (Smilaceæ) are officinal in the U. S. P. under the general title of sarsaparilla. They are brought here from Mexico, Central America, and Brazil, chiefly, the roots varying in value and appearance. Smilax officinalis, or so-called Jamaica sarsaparilla, is the only one recognized by the British Pharmacopœia. The roots are small, about ½ inch in diameter, 6 or 7 feet in length; they are usually folded up into bundles about 26 inches long. They are inodorous; the taste is mucilaginous, bitter, and acrid. The flavoring known as sarsaparilla at the soda-water fountain is made from oil of sassafras and

gaultheria. An acrid, neutral principle, **Parillin** or **Smilacin** (closely resembling saponin) has been found, combined with resin ($2\frac{1}{2}$ per cent.) and traces of volatile oil. It is not known to which of these constituents the physiological effects are to be attributed.

Physiological Action.—The experiments undertaken to determine the physiological effects of sarsaparilla have yielded negative results, and deductions from the therapeutical effects are not available because it is always given with other drugs, classed by Brunton among stimulant diuretics and alteratives. It is probably inert, or nearly so, in the doses usually given, though moderate doses sometimes seem capable of improving the appetite and digestion. In much larger doses it would, probably, give the physiological effects of smilacin (saponin?). The chief value of the preparations of sarsaparilla is that they are pleasant vehicles for disguising the taste of iodide of potassium and of mercury, with which they are usually prescribed for syphilis:—

℞ Potassii iodidi, ... ℥ss.
Syr. sarsaparillæ co.,
Aquæ destillatæ, ... āā f℥iij.

M. Sig.: A dessertspoonful in a glass of water two hours after meals in syphilitic skin affections.

Or, in the tertiary form of syphilis, we may give the recent decoction, which, if drunk hot, causes diaphoresis and diuresis, thus greatly increasing the alterative effects. There is no evidence of a curative action of sarsaparilla by itself in syphilis; nevertheless, in debilitated subjects in whom mercury has, for a time, lost its beneficial action, or become positively harmful, a temporary recourse to sarsaparilla has been considered useful by excellent observers. Phillips believes that this remedy is serviceable in chronic pulmonary affections, where there is much wasting; in chronic rheumatism and cutaneous disorders, in which there may be suspected a venereal taint, sarsaparilla is useful. Sir Astley Cooper considered it serviceable in cachectic conditions of the system, caused by long-continued suppuration; also, in chronic abscesses, old ulcers, and bone disease. In Germany, a compound decoction containing alum, kino, calomel, senna, and aromatics (Zittman's decoction) is used in syphilis, chronic rheumatism, and in scrofulous disorders.

SASSAFRAS (U. S. P.).—Sassafras-Root Bark.

Preparations.

Sassafras Medulla (U. S. P.).—Sassafras-Pith.

Mucilago Sassafras Medullæ (U. S. P.).—Mucilage of Sassafras-Pith (2 parts in water 100).

Oleum Sassafras (U. S. P.).—Oil of Sassafras. *Dose*, ♏ii–iv.

Infusum Sassafras (U. S. P.).—Infusion of Sassafras (℥j to Oj). *Dose*, f℥ii–viij.

Pharmacology.—Sassafras is the bark of the root of Sassafras officinalis (Lauraceæ), common in the United States from Canada to Florida. The principal constituent of the bark is the volatile oil; it also contains tannic acid, resin, etc. The oil of sassafras is of a light-yellow color, and is a mixture of two oils, one lighter, the other heavier, than water. Sassafras also contains a peculiar principle, termed **Sassafrin.** The pith of the branches contains mucilage, which is used in pharmacy as a vehicle or diluent.

Physiological Action.—The oil is stimulant and rubefacient, and, taken internally, is a carminative. It is largely used as a flavoring agent in confectionery as well as pharmacy. It enters into the officinal sarsaparilla preparations, and adds to their alterative influence.

Therapy.—Sassafras is an aromatic stimulant, and small bundles of the fresh bark are sold by herb-gatherers to be chewed for its flavor and as a carminative. A recent infusion is used in some parts of the country as a blood-purifier; or, taken hot, as an emmenagogue and diaphoretic. Sassafras is generally given in combination with guaiac and sarsaparilla, and in those cases where the latter agents are considered indicated. The mucilage of sassafras-pith may be used as a demulcent drink in inflammation of the stomach or bowels, especially when this has been excited by irritant or corrosive substances. It is a cooling application to inflamed eyes or erysipelas, and may be used as a vehicle for other remedies. The following is known as Jackson's Pectoral Syrup:—

℞ Medullæ sassafras, ... ʒss.
Acaciæ, ... ʒv.
Aquæ, ... f℥viss.
Allow this to stand for twelve hours, stirring occasionally, then add
Sacchari, ... ℥x.
Dissolve without the aid of heat, strain, and add
Morphinæ hydrochloratis, ... gr. iij.

M. Sig.: Dose, one to two teaspoonfuls several times daily (each drachm contains about gr. $\frac{1}{25}$ morphine).

Another formula for this syrup is given by Remington:—

℞ Ol. sassafras, ... ♏lxiv.
Tinct. tolutani, ... f℥viij.
Magnesii carb., ... ℥ij.
Aquæ, ... Oviij.
Sacchari, ... lbs. xiv (avoir.).
Morphinæ hydrochloratis, ... gr. lxiv.

M. Rub up the tincture and oil with the carbonate, gradually add ¼ pound of the sugar and then the water, filter and recover 8 pints, in which dissolve the remainder of the sugar. Dissolve the morphine in one fluidounce of water, add to the syrup, and make the measure up to 16 pints.

Sig.: Take a teaspoonful or more several times daily for cough (each drachm contains $\frac{1}{32}$ grain of hydrochlorate of morphine).

SCAMMONIUM (U. S. P.).—**Scammony.**
Dose, gr. v–xv.

Preparations.

Resina Scammonii (U. S. P.).—Resin of Scammony. *Dose*, gr. iv–viij.
Extractum Colocynthidis Compositum (U. S. P.).—Compound Extract of Colocynth (resin of scammony 14, aloes 50, colocynth 16, cardamom 6, soap 14 parts). *Dose*, gr. ii–x.
It is also an ingredient in the compound cathartic pill. (See page 566.)

Pharmacology.—Scammony is a resinous exudation from Convolvulus scammonia (Convolvulaceæ). It contains about 80 per cent. of a resin, soluble in alcohol and ether (which is officinal), and gum, starch, etc. **Scammonin** (Jalapin) is the active principle. Scammony has a slightly acrid taste and a peculiar odor, which recalls that of cheese. Scammonin is a glucoside, nearly insoluble in water, soluble in alcohol, chloroform, ether, and alkaline solutions.

Physiological Action.—This drug is a hydragogue cathartic, and feebly cholagogue; in large doses it causes symptoms of irritant poisoning. Absorption depends upon its intimate mixture with the alkaline bile and intestinal fluids, and for this reason the action of scammony is liable to vary in rapidity and power. Its effects are usually manifested in about four hours.

Therapy.—In children, where active purgation is required, calomel and scammony may be given, triturated with sugar of milk. In cerebral affections and dropsies, scammony is useful, especially in the form of compound extract of colocynth. It clears mucus from the intestines, and is an anthelmintic against both round-worms and tape-worms. Scammony is serviceable in obstinate constipation and impaction of fæces. It is a purgative well adapted to cases of mania and hypochondriasis.

SCILLA (U. S. P.).—**Squill.**
Dose, gr. ii–iij.

Preparations.

Extractum Scillæ Fluidum (U. S. P.).—Fluid Extract of Squill. *Dose*, ♏i–v.
Acetum Scillæ (U. S. P.).—Vinegar of Squill (10 per cent.). *Dose*, ♏v–f℥j.
Tinctura Scillæ (U. S. P.).—Tincture of Squill (15 per cent.). *Dose*, ♏v–xxx.
Syrupus Scillæ (U. S. P.).—Syrup of Squill (vinegar of squill with sugar). *Dose*, ♏x–f℥j.
Syrupus Scillæ Compositus (U. S. P.).—Compound Syrup of Squill (squill and senega, of each 30 grains, tartar emetic ¾ grain in each ounce). *Dose*, ♏x–f℥j.
Oxymel Scillæ.—Oxymel of Squill (equal parts honey and vinegar of squill). *Dose*, ♏xx–f℥ij.

Pharmacology.—The sliced and dried bulb of Urginea scilla (Liliaceæ), coming from the Mediterranean. The white squill is the best. It readily absorbs moisture and deteriorates; it should be kept in a dry place. The active principles are **Scillipicrin, Scillitoxin,** and **Scillin;**

sculein and scillitin are probably impure scillitoxin, which is the most active of the three.

Physiological Action.—In large doses squill is emetic and purgative; in smaller quantities, diuretic and expectorant. In excessive quantity it gives rise to severe or even fatal gastro-enteritis. Brunton classes scillitoxin among the cardiac tonics, as medicinal doses slow the heart and raise the arterial tension, like digitalis. When applied to the skin it is absorbed, and produces systemic effects. Elimination takes place by the bowels, kidneys, and bronchial mucous membrane. Squill has a bitter taste and feeble smell.

Therapy.—Squill is not used by itself as an emetic, although the compound syrup, containing tartrate of antimony and potassium, is sometimes used for this purpose in young children suffering with bronchitis or croup; but it is too depressing for ordinary cases. In weak heart, associated with dropsy or bronchial disorder, squill is especially useful, the vinegar of squill being a good preparation. Its diuretic action is enhanced by combination with calomel and digitalis. In ordinary catarrhal bronchitis, squill is useful after the first stage has passed, and the secretions are becoming more tenacious. As the syrup contains acetic acid, it should not be prescribed with carbonate of ammonium. In whooping-cough it is very serviceable. It should not be given in acute renal disease on account of causing irritation of the kidneys.

SCOPARIUS (U. S. P.).—Broom.

SCOPARIUS SUMMITATES.—Broom-Tops.

Dose, ℥j, in infusion.

Pharmacology.—The tops of Sarothamnus scoparius (Leguminosæ), of Europe, contain **Scoparin,** which is a crystallizable neutral principle, and **Sparteine,** a volatile liquid alkaloid. There are no officinal preparations, but an infusion or decoction is frequently used (℥j–Oj), a pint or more in divided doses being taken during the day. **Sparteine sulphate** is given in doses of gr. $\frac{1}{24}$ to $\frac{1}{2}$ hypodermatically, and gr. $\frac{1}{2}$–ij, or more, by the mouth.

Physiological Action.—No local action. Internally, broom, in large doses, excites vomiting and purging, and in smaller doses causes marked increase of urinary flow. It is asserted that scoparine is the agent which acts upon the kidneys, and that sparteine acts upon the heart as a stimulant or tonic, like scillitoxin or digitalin. Sparteine has also a decided effect upon the nerves and spinal cord, lowering reflex action, paralyzing motor nerves, reducing the electrical excitability of the vagus, and finally causing death by respiratory paralysis, both as the

result of its action upon the centre and upon the muscles of respiration. The action upon the heart, due both to a nervous and a muscular stimulation, is manifested soon after its administration; the pulse becomes slower at first, and, in about an hour, arterial tension is raised, and the effects last five or six hours. When taken regularly for a few weeks, the effects continue for several days after the remedy has been stopped.

According to the experiments of Gluzinski, the effects of sparteine are much more marked upon cold-blooded animals than mammals, and are more striking in the former when the drug is applied directly to the heart than when injected subcutaneously or into a vein.* Clarke found no evil results following the administration of gr. $\frac{1}{16}$ every four hours, or as much as gr. xij in twenty-four hours, nor was there any evidence of cumulative action when it had been given for several months. Sparteine is a true diuretic, increasing both the urea and the water of the urine, being more rapid in its action, but weaker than digitalis.

Therapy.—In renal inadequacy or deficiency of urine, owing to insufficient arterial tension, scoparius is an excellent remedy; also in the œdema, or dropsy, accompanying heart-lesions. This remedy should not be given during the progress of inflammation of the lungs, heart, or kidneys, but in chronic parenchymatous nephritis broom may be used with advantage. In hydrothorax and ascites, the use of broom, in conjunction with occasional doses of compound jalap-powder, is very successful:—

℞ Potassii acetatis,	ʒiss.
Aceti scillæ,	fʒiv.
Infus. scoparii, q. s. ad	f℥viij.

M. Sig.: Take a tablespoonful every four hours, as a diuretic.

Sparteine sulphate is used by Germain Sée, in weak and irregular action of the heart, in doses of gr. $\frac{1}{4}$–$\frac{1}{6}$ every four hours. It gives the best results in heart-failure, the result of mitral disease. In irregular action of the heart this has been found specially serviceable. In cases of valvular disease, with defective compensation, Gluzinski states that small doses of the sulphate of sparteine ($\frac{1}{3}$ to $\frac{2}{3}$ grain) are more efficacious than larger quantities. In exophthalmic goitre (Graves's disease), it is claimed to relieve all the symptoms; and, given at the onset of a paroxysm of asthma (of cardiac origin?), it promptly checks it. Hare † considers sparteine sulphate valueless, and a useless drug.

SCUTELLARIA (U. S. P.).—Skull-Cap.

Preparation.

Extractum Scutellariæ Fluidum (U. S. P.).—Fluid Extract of Skull-Cap. *Dose*, fʒss–j.

* Wien. Med. Blätter, Dec. 26, 1889; The Medical Bulletin, March, 1890, p. 91.
† Practical Therapeutics, Philadelphia, 1890, p. 267.

Pharmacology and Physiological Action.—The herb of Scutellaria lateriflora (Labiatæ) has a bitter taste, and contains a little volatile oil and a bitter principle. The eclectic "**Scutellarin**" is an impure extract, probably devoid of medical qualities. It is given in doses of gr. ii–iv. The fluid extract is esteemed to possess tonic, antispasmodic, and alterative powers, but Dr. Lawrence Johnson states that if it possess any valuable medicinal properties the fact remains to be demonstrated.

Therapy.—In various diseases, accompanied by twitching of the muscles, restlessness, tremors,—such as chorea, delirium tremens, epilepsy, etc.,—scutellaria has been employed, chiefly, however, in domestic practice. Its claims for usefulness in hysteria and hydrophobia are not well founded.

SECALE CORNUTUM.—Spurred Rye. (See Ergot, page 603.)

SEDUM ACRE.—Stonecrop, or Wall-Pepper.
Dose, ʒss–j.

Preparation.

Extractum Sedi Acris Fluidum.—Fluid Extract of Sedum Acre (made from the whole plant). *Dose,* ♏xv–xxx, gradually increased.

Pharmacology.—Sedum acre (Crassulaceæ), stonecrop or wall-pepper, is a small, moss-like, spreading plant, a native of Europe. It grows in dry fields and on old walls, with no smell, but has a mucilaginous and acrid taste.

Physiological Action and Therapy.—The juice of the stonecrop is a decided local irritant, and is capable of blistering the skin. Taken internally, in large doses, it acts as an acrid emetic and purgative. The bruised plant, or its juice, has been used with success upon indolent or unhealthy sores and enlarged lymphatic glands. The juice has been used to remove warts or corns. Dr. Louis Duval, of Madrid, asserts that sedum is of signal service in diphtheria, made into a decoction with beer. From 1 to 2 litres ($1\frac{3}{4}$ to $3\frac{1}{2}$ pints) of this decoction are given in hourly doses. When about four doses have been taken, free vomiting ensues, with removal of the false membranes. Injection of the decoction into the nares is said to be effective in nasal diphtheria. It is claimed that this drug possesses the power of loosening the diphtheritic membrane, and that it does not form anew. These statements have been confirmed by several physicians in other European countries, and by Dr. P. O. Wagener.* The latter writer cannot commend the decoction in beer, but obtains the same effects from the remedy used locally, and combined as follows:—

* Therapeutic Gazette, 1885, p. 449.

℞ Ol. terebinthinæ,
Acid. lactici,
Ext. aconiti fl., ... āā f℥ij.
Ext. sedi acris fl., ... f℥j.

M. This mixture is applied with a brush, every three minutes, for twenty minutes, when vomiting occurs and the membrane is expelled.

SENEGA (U. S. P.).—**Senega.**
Dose, gr. x–xx.

Preparations.

Abstractum Senegæ (U. S. P.).—Abstract of Senega. *Dose*, gr. v–x.

Extractum Senegæ Fluidum (U. S. P.).—Fluid Extract of Senega. *Dose*, ♏x–xx.

Syrupus Senegæ (U. S. P.).—Syrup of Senega (fluid extract 160, ammonia-water 4, sugar 600, water 1000). *Dose*, f℥i–ij.

The compound syrup of squill contains 6 per cent. of senega.

Pharmacology.—The root of Polygala senega (Polygalaceæ) is a knobby root-stock, with spreading, tortuous rootlets, twisted and keeled. It grows in the United States, especially in the South. The active principle, which is contained especially in the cortex, is **Senegin,** or **Polygalic acid,** and is apparently the same as saponin from saponaria, or quillaya-bark. It is a white powder, easily soluble in hot water and alcohol, forming a soapy emulsion when mixed with water, even in small quantities.

Physiological Action.—Senega is irritating to the air-passages and causes sneezing when inhaled. The root, when chewed, gives rise to a burning sensation. When swallowed in large doses, senega excites salivation and gastro-intestinal and renal irritation. It is likewise irritant when applied to the integument. It is a stimulating expectorant, diuretic, and diaphoretic. It does not liquefy the secretions of the bronchial tubes, but simply facilitates their expulsion. When the expectoration is tough and scanty, senega is of little use. It is usually given in combination with other expectorants and diuretics. Senega is excreted by the bronchial mucous membrane, skin, and kidneys, exercising upon these organs a stimulating action.

Therapy.—Senega is useful in the second stage of bronchitis, or pneumonia in the stage of resolution. In chronic bronchitis, associated with emphysema and occurring in aged people, it will often answer a good purpose. By some practitioners it is esteemed beneficial in croup. In bronchial asthma with emphysema, this remedy is likewise of considerable efficacy. Whooping-cough is sometimes ameliorated by the administration of senega. In dropsy, accompanying renal disease, it is useful. In palpitation, associated with aortic disease, and also in amenorrhœa, it has been found serviceable:—

℞ Ext. senegæ fl.,
Spts. chloroformi, ... āā f℥j.
Syr. pruni Virg., ... q. s. ad f℥ij.
M. Sig.: Take a dessertspoonful every two or three hours, for cough.

Senega is not to be used in heart disease on account of the depressing effects of its active principle. (See Saponin, page 889.) Senega has been administered, in doses of gr. ij, in uterine hæmorrhage. A decoction of senega-root, a pint being taken daily for a fortnight before the expected period, has been successfully employed in amenorrhœa. In chronic rheumatism, its diaphoretic and diuretic effects are useful.

SENNA (U. S. P.).—**Senna.**
Dose, ʒi–iiss.

Preparations.

Extractum Sennæ Fluidum (U. S. P.).—Fluid Extract of Senna (made by percolation). *Dose,* ♏xxx–fʒiv.

Syrupus Sennæ (U. S. P.).—Syrup of Senna (contains senna, coriander, alcohol, and syrup; or, fluid extract, f℥j; spirit of coriander, ♏xvj; and simple syrup, f℥ij). *Dose,* fʒi–iv.

Infusum Sennæ Compositum (U. S. P.).—Black Draught (senna, ℥j; manna, ℥ij; Epsom salt, ℥ij; fennel, bruised, gr. cl; water, Oj). *Dose,* f℥i–iiss, every four hours until it operates.

Confectio Sennæ (U. S. P.).—Confection of Senna (cassia fistula 16, senna 10, coriander 6, tamarind 10, prune 7, fig 12, sugar 50, water 60, to make 100 parts). *Dose,* ʒi–ij.

Pulvis Glycyrrhizæ Compositus (U. S. P.).—Compound Liquorice-Powder (senna 18, liquorice-root 16, fennel 3, washed sulphur 8, sugar 50 parts). *Dose,* ʒi–ij.

Extractum Sennæ.—Extract of Senna (fluid extract evaporated). *Dose,* ʒi–iv.

Extractum Sennæ Fluidum Deodoratum (N. F.).—Deodorized Fluid Extract of Senna. (The leaves of senna are first washed with alcohol to extract the odorous and griping qualities of the drug, and are then used to prepare a fluid extract, as in the officinal preparation. This form is a pure, deodorized liquid senna of definite strength, and pleasant and certain in its effects.) *Dose,* fʒi–iv.

Infusum Sennæ.—Infusion of Senna (℥j–Oj). *Dose,* f℥i–v.

Also enters into the compound syrup of sarsaparilla.

Pharmacology.—Senna is the pharmacopœial title for the leaflets of Cassia acutifolia (Alexandria senna) and of Cassia elongata (India senna), plants of the natural order Leguminosæ, Cæsalpinieæ, freed from stalks, discolored leaves, and other admixtures. The principal constituent is **Cathartic acid,** a sulphurated glucoside, which exists in the drug in combination with earthy bases, such as calcium and magnesium, in salts which are soluble in water. **Sennacrol** and **Sennapicrin,** found in the drug, do not contribute to its physiological action, since they are insoluble in water. Senna also contains chrysophanic acid (Phillips). The activity of senna is destroyed by heat. In addition to the principles just named, senna contains some odorous and other constituents, which impart to it a nauseating taste, but do not add to its therapeutic value, since they may be extracted with alcohol without impairing the effects.

Physiological Action.—Senna has a faint, disagreeable smell and a bitter, nauseous taste. Senna is an active, but not an acrid, cathartic. It generally acts in about four hours, producing copious, yellow stools; any tendency to griping may be avoided by using the deodorized fluid extract, or by combining aromatics with the other preparations. It is a hepatic stimulant of feeble power, rendering the bile more watery. Its use as a cathartic does not produce constipation. The menstrual flow may be excited by it, and if given to a nursing woman her milk may acquire purgative properties. Injected into the veins, it produces both vomiting and purging, and in overdoses it acts as a drastic cathartic, but is never poisonous in its effects. It is too irritant to the bowel to use in full doses where hæmorrhoids are present. When taking senna the urine sometimes has a red color.

Therapy.—This drug is a safe, efficient, and, when combined with other drugs, a pleasant cathartic for constipation, or where simple unloading of the bowels is required. It should not be given where there is danger of abortion, or where inflammatory conditions of the intestine exist. It is a favorite laxative for pregnant women in the form of confection of senna and compound liquorice-powder, and the syrup is a good laxative for children. The infusion is useful to carry off worms from the intestinal canal. Black draught is an efficient but decidedly uninviting cathartic, and has nearly gone out of use, because its place has been taken by more pleasant remedies. Bartholow states that the addition of coffee masks the unpleasant taste of senna. The following formula for a cheap and efficient laxative is given by Mr. G. H. Dunn: One-half ounce of senna-leaves are placed in a quart of water and boiled fifteen minutes in a covered dish. The liquid is then strained and $\frac{1}{4}$ ounce of dry sugar added; $\frac{1}{2}$ pound each of figs and prunes are cut up, added to the liquid, and the whole is boiled until the fruits get thoroughly soft. Dose, one teaspoonful after each meal. A better method of making this would be to stew the fruit separately, and, after it has cooled, to add $\frac{1}{2}$ ounce of the deodorized fluid extract, since the active principle, cathartic acid, is destroyed by heat. Laxative prunes may be made by adding syrup of senna or the fluid extract to the stewed fruit. The confection of senna made into a flattened bolus (ʒi–ij), and coated with sugar or chocolate, is sometimes known as fruit laxative, or "Tamar Indien," as it contains tamarind. They are readily eaten by children.

SERPENTARIA (U. S. P.).—**Serpentaria, Virginia Snake-Root. Dose,** gr. x–ʒj.

Preparations.

Extractum Serpentariæ Fluidum (U. S. P.).—Fld. Ext. of Serpentaria. *Dose,* ♏x–xxx.
Tinctura Serpentariæ (U. S. P.).—Tincture of Serpentaria (10 per cent.). *Dose,* f℥i–ij.
The compound tincture of cinchona contains 2 per cent. of serpentaria.

Pharmacology.—The rhizome and rootlets of Aristolochia serpentaria and of Aristolochia reticulata (Aristolochiaceæ), plants growing in the southern and western portions of the United States. The name snake-root, of itself, is not distinctive, and should not be used, because by this title several different plants are commonly called; for instance, Canada snake-root is Asarum Canadense, or wild ginger; black snake-root is Actæa racemosa, or cimicifuga; evergreen snake-root is Polygala paucifolia, or fringed polygala; while rattlesnake-root, or seneka snake-root, is Polygala senega, and Virginia snake-root is Aristolochia serpentaria. The latter contains a bitter principle, **Aristolochin,** soluble in water and alcohol; also a **volatile oil** and some **resin.** The active principle is not used in medicine. All the preparations should be made from the fresh root, as it deteriorates by keeping.

Physiological Action.—Serpentaria is a tonic, a cardiac stimulant, and has some antiperiodic powers. It has a pungent, characteristic flavor, and small doses promote appetite and digestion, and are slightly exhilarating. Large doses cause considerable intestinal disturbance, flatulence, tenesmus, and frequent evacuations of semi-solid stools; they are also productive of nausea and vomiting, with much headache and dizziness. Hæmorrhoids are irritated and menstruation is stimulated. The drug is expectorant. The compound syrup of sarsaparilla owes its restorative and alterative qualities largely to the presence of serpentaria. Although asserted to possess aphrodisiac powers, it is doubtful if serpentaria has any direct influence of this kind; probably acting simply as a stimulant to the circulation and as a general tonic.

Therapy.—Though physiologically active, serpentaria is rarely used alone. In atonic dyspepsia it is a useful adjunct to cinchona in the compound tincture. It is also a good general tonic. Tablespoonful doses of a decoction of serpentaria are often able to allay bilious vomiting. The infusion is a useful wash for spongy gums, diphtheritic inflammation, or the sore throat of scarlatina. In pneumonia of a low type, serpentaria is useful in combination with the aromatic spirit of ammonia; and in bronchial catarrh it is a good expectorant. Its combination of expectorant and stimulant properties renders serpentaria useful, also, in capillary bronchitis. It has some reputation as a restorative in typhoid and typhus fevers, and in depressed conditions of the system generally. In chronic rheumatism it may be given in combination, with excellent results. In amenorrhœa dependent upon anæmia or chlorosis, serpentaria is said to have given good results.

SESAMI OLEUM (U. S. P.).—**Oil of Sesami, Benné** or **Teel Oil.**

Pharmacology.—A fixed oil, similar to cottonseed-oil, expressed from the seed of Sesamum Indicum (Pedaliaceæ). It is bland, inodor-

ous, or nearly so, neutral in reaction, rich in olein, and is said to keep better than olive-oil. In large doses it is laxative, and emmenagogue properties have been attributed to it without much foundation. The seeds are used as food by the negroes of the South.

SEVUM (U. S. P.).—**Suet.**

Pharmacology and Therapy.—The internal fat of the abdomen of Ovis aries (class, Mammalia; order, Ruminantia), purified by melting and straining. If in well-closed vessels, it will keep for an indefinite time in a cool place, without turning rancid, which would spoil it for pharmaceutical purposes. It is a solid fat, with slight taste and very little odor, consisting chiefly of stearin. It is used to give greater consistency to ointments, and enters into the officinal ointments of mercury and tar. For warm weather, a good ointment can be made as follows:—

℞ Hydrarg. chloridi mitis,	gr. xl.
Sodii benzoatis,	gr. x.
Sevi,	℥j.
Olei amygdalæ amaræ,	♏ij.

M. Sig.: For eczema or intertrigo. Apply upon soft linen.

SILICON.—**Silica.**

Preparation.

Liquor Sodii Silicatis (U. S. P.).—Solution of Silicate of Sodium, or Soluble Glass. For external use.

Pharmacology and Therapy.—Silicon is a non-metallic, elementary body, discovered by Berzelius in 1825. Its atomic weight is 28. It is obtained in two forms,—amorphous and crystalline. In nature, its compounds, with fluorine (silicon fluoride) and oxygen (silicic oxide), are widely diffused, and are known as fluor-spar and rock-crystal, or quartz, and, in a granular form, as sandstone or sand. Chalcedony, opal, and onyx, prized by the lapidary, are forms of the oxide. Crystallized quartz, or rock-crystal, is used for the manufacture of spectacle glasses and lenses. Window-glass is a mixture of potassium or sodium silicate with calcium silicate, and often contains aluminium silicate also. It is made by the prolonged fusion of potassium or sodium carbonate with pure quartz-sand and lime. Flint-glass contains lead, introduced in the form of red lead. Various colored glasses are made by adding metallic oxides to the above ingredients previous to fusion. **Hydrofluosilicic acid** is a saturated aqueous solution of this acid, prepared by passing silicon fluoride (which is a colorless, suffocating gas, producing white fumes when allowed to escape into the air) through water. It is employed as a reagent in the laboratory.

The **Silicate-of-Sodium** solution is a clear, almost colorless, viscid fluid, odorless, with alkaline taste and reaction, and should not produce

any irritant effects upon the skin. It dries in a short time, and has a smooth, glassy surface. In making dressings for fractures, successive layers of bandage are applied smoothly to the limb, rubbing the solution into each layer of bandage, until a sufficient thickness is obtained. The dressing is then allowed to dry, and a finishing coat is given with the brush, making a good, permanent dressing. If desired, when applied to a limb, the apparatus may be slit up the back and front, and trimmed with scissors, so as to make two lateral molded splints.

A solution of **Silicate of Potassium** is used in the same manner as the preceding, and, by some, a mixture of these two is considered preferable to either alone. It also has antiseptic qualities, and has been used as an injection, properly diluted, in gonorrhœa, vaginitis, and cystitis; or applied as a dressing to erysipelas, with asserted good results.

The compound known as the silico-fluoride of sodium has had a limited use as an antiseptic. Laplace reports that in the laboratory, as well as in the clinic-room, negative results have followed its employment as an antiseptic. Flagg, on the other hand, in dental practice, says silico-fluoride of sodium is both a disinfectant and antiseptic. It is used in the form of a salt or solution (5 to 8 per cent.) in water. It is, he adds, noteworthy as possessing the unusual and most desirable characteristics of being non-irritant, non-poisonous, neither discoloring nor staining, of decided rank as disinfectant and deodorizer, odorless, and of positively indefinite maintenance of integrity,—the solutions of three years' duration giving clinical evidence of being unchanged. The hydrated silicate of magnesium has been utilized in France as a protective and absorbent in diarrhœa, in the same way that bismuth is ordinarily used in doses of ʒi–ij. Friction with sand has been employed by Ellinger as a method of detaching the scales in psoriasis.

SIMULO.—Simulo.

Dose, ♏xx–fʒj, in fluid extract or as a tincture.

Pharmacology.—An herb of the Caper family, Capparis corriaceæ (Capparidaceæ), known as the simulo-plant, has had attention directed toward it recently by the investigations of Eulenberg* and others. No analysis has yet been made, and it is not known definitely whether or not it has any principle with positive therapeutic action. The kernel of the fruit, which is almond-shaped, is the portion used. An alcoholic tincture of the drug has been employed, but it is less valuable than a fluid extract, since the alcohol may counteract the sedative influence of the remedy.

Physiological Action.—The physiological effects have not been

* Therapeutic Gazette, October 15, 1888.

investigated. Under its therapeutic use, Dr. Starr observed no change in pulse, respiration, or temperature; no effect upon the pupils, no muscular weakness, no mental depression or stimulation, and no digestive disturbance. It appears to be quite innocuous, even in large doses, according to Dr. V. Paulet.

Therapy.—Simulo is one of the many agents which have been brought forward to cure cases of epilepsy, and in other nervous affections favorable results from its use have also been reported. Dr. V. Paulet found it to have decidedly good effects in hysteria and chorea.* Dr. W. H. White used the tincture of simulo in 7 cases of epilepsy, giving 1 or 2 drachms three times a day. In all the patients considerable improvement took place, though complete cure was attained in none. Eulenberg administered it to 4 cases of epilepsy and 3 of grave hysteria, and with benefit in only one of the epileptics. In this instance it diminished the number of paroxysms at first, but afterward seemed to lose its effect. He considered simulo inferior to the bromides. Dr. M. Allen Star finds that it has some effect in modifying the frequency and severity of attacks of grand mal, but is in this respect inferior to the bromides. It is useless in petit mal and in hystero-epilepsy. About the only field of usefulness for simulo would appear to be when, for any reason, it is deemed necessary to temporarily suspend the use of the bromides. Dr. L. C. Gray, in several cases, found the drug useless.†

SINAPIS ALBA (U. S. P.).—White Mustard.

SINAPIS NIGRA (U. S. P.).—Black Mustard.

Preparations.

Chartæ Sinapis (U. S. P.).—Mustard-Leaves.

Oleum Sinapis Volatile (U. S. P.).—Volatile Oil of Mustard.

Linimentum Sinapis Compositum (U. S. P.).—Compound Mustard Liniment (volatile oil of mustard 3, ext. mezereon 2, camphor 6, castor-oil 15, alcohol q. s. ad 100 parts). For external use.

Pharmacology.—White and black mustard are the seeds of Sinapis alba and Sinapis nigra (Cruciferæ, Siliquosæ), respectively. They form the flour of mustard when ground to a fine powder; commercial flour of mustard is a mixture of both kinds of seeds ground together. The pungency of the moist powder is due to the volatile oil of mustard, which does not exist in the whole seeds. The black and white varieties each contain a crystalline substance,—in the former **Sinigrin**, in the latter **Sinalbin**,—together with an albuminous ferment, **Myrosin**. When water is added, both sinigrin and sinalbin are split up by the myrosin and produce a

* American Journal of Insanity, July, 1890.

† Therapeutic Gazette, June 15, 1889, p. 396.

volatile oil which is not quite identical in the two mustards, that from the black mustard being the more pungent. (This is known as the sulphocyanate of allyl, while the other is the sulphocyanate of acrinyl.) The action of myrosin is suspended at 60° C. (140° F.); so that mustard poultice should not be made with boiling water. White mustard, even when ground and mixed with water, is inodorous, but when added to the black variety it increases the yield of volatile oil. Both kinds also contain fixed oil; as well as **Sinapine** (an alkaloid), **brassic acid,** and other vegetable principles.

Physiological Action.—When applied to the skin, if moisture is present, mustard-flour causes hyperæmia, and, if the action is continued, it will vesicate, making a painful and slow-healing blister. The seeds of white mustard have been used as a condiment and mechanical laxative, in tablespoonful doses after meals. Table-mustard is made by adding water to mustard-flour; it may also contain spices or vinegar.

Therapy.—Mustard-leaves (4 inches square) are very convenient for applying counter-irritation, being always ready for use and only needing dampening with cold water, in pleurodynia, lumbago, colic, croup, and numerous other conditions requiring this treatment; applied to the calves of the legs, as well as other parts of the body. They should remain ordinarily about four or five minutes, but may remain longer; they should not be left on all night, for fear of making a slough which would leave a scar. Mustard poultices to the feet and legs are employed as derivatives in apoplexy and intoxication from alcohol or opium. In weak digestion, a little mustard, as a condiment with meats, assists digestion and stimulates the secretion of gastric and intestinal fluids.

Mustard foot-baths, made by adding a handful of ground mustard to hot water, is a good revulsant in recent colds, sleeplessness, amenorrhœa, headache, etc. Mustard-water is a useful emetic in narcotic poisoning. A hot mustard-bath is an efficient aid to other treatment in allaying maniacal excitement. It is of value, moreover, in cases of recession of the eruption in scarlet fever and measles.

In medicinal preparations, mustard is occasionally administered with advantage as an internal remedy. Obstinate hiccough has been relieved by an infusion made by steeping a teaspoonful of mustard in 4 ounces of boiling water for twenty minutes and then straining (Ringer). An alcoholic solution of the oil of mustard has been found of efficiency in chronic gastric and bronchial catarrh. The solution contains 24 drops of the oil to the ounce of spirit, and is given in doses of 3 to 5 drops in an emulsion. The same preparation is said to have been of service as a diuretic in dropsy. A mustard-whey, made by boiling ½ ounce of mustard-flour in a pint of milk, has also been utilized in dropsy.

SODIUM.—The metallic element, Sodium (Natrium). Not used in medicine, except in combination.

Preparations.

Soda (U. S. P.).—Soda, Caustic Soda.

Sodii Acetas (U. S. P.).—Acetate of Sodium. *Dose*, gr. xv–ʒj.

Sodii Arsenias (U. S. P.).—Arseniate of Sodium. *Dose*, gr. $\frac{1}{12}$–$\frac{1}{8}$.

Sodii Benzoas (U. S. P.).—Benzoate of Sodium. *Dose*, gr. x–xx.

Sodii Boras (U. S. P.).—Borate of Sodium, Borax. *Dose*, gr. x–xl.

Sodii Bromidum (U. S. P.).—Bromide of Sodium. *Dose*, gr. xx–ʒj.

Sodii Carbonas (U. S. P.).—Carbonate of Sodium (washing-soda). *Dose*, gr. v–xx.

Sodii Carbonas Exsiccatus (U. S. P.).—Dried Carbonate of Sodium. *Dose*, gr. v–x.

Sodii Bicarbonas (U. S. P.).—Bicarbonate of Sodium (baking-soda). *Dose*, gr. v–xl.

Sodii Bicarbonas Venalis (U. S. P.).—Commercial Bicarbonate of Sodium.*

Sodii Chloridum (U. S. P.).—Chloride of Sodium (table-salt). *Dose*, gr. v–xl.

Sodii Chloras (U. S. P.).—Chlorate of Sodium. *Dose*, gr. ii–x.

Sodii Hypophosphis (U. S. P.).—Hypophosphite of Sodium.† *Dose*, gr. x–xx.

Sodii Hyposulphis (U. S. P.).—Hyposulphite of Sodium. *Dose*, gr. x–xx.

Sodii Iodidum (U. S. P.).—Iodide of Sodium. *Dose*, gr. x–xl.

Sodii Nitras (U. S. P.).—Nitrate of Sodium (saltpetre). *Dose*, ʒi–ij.

Sodii Phosphas (U. S. P.).—Phosphate of Sodium. *Dose*, gr. v–℥j.

Sodii Pyrophosphas (U. S. P.).—Pyrophosphate of Sodium. *Dose*, gr. v–xl.

Sodii Sulphas (U. S. P.).—Sulphate of Sodium (Glauber's salt). *Dose*, ℥ss–j.

Sodii Sulphis (U. S. P.).—Sulphite of Sodium. *Dose*, gr. xx–ʒj.

Sodii Bisulphis (U. S. P.).—Bisulphite of Sodium. *Dose*, gr. x–ʒss.

Sodii Salicylas (U. S. P.).—Salicylate of Sodium. *Dose*, gr. x–ʒj.

Sodii Santoninas (U. S. P.).—Santoninate of Sodium. *Dose*, gr. ii–x.

Sodii et Potassii Tartras (U. S. P.).—Tartrate of Sodium and Potassium (Rochelle salt). *Dose*, ʒi–iv.

Sodii Sulphocarbolas (U. S. P.).—Sulphocarbolate of Sodium. *Dose*, gr. ii–v.

Liquor Sodæ (U. S. P.).—Solution of Soda (5 per cent.). *Dose*, ♏v–x.

Liquor Sodæ Chloratæ (U. S. P.).—Solution of Chlorinated Soda (Labarraque's solution). Should contain at least 2 per cent. of available chlorine. *Dose*, fʒss–j.

Liquor Sodii Arseniatis (U. S. P.).—Solution of Arseniate of Sodium (1 per cent.). *Dose*, ♏iii–v.

Liquor Sodii Silicatis (U. S. P.).—Solution of Silicate of Sodium (specific gravity, 1300–1400).

Mistura Rhei et Sodæ (U. S. P.).—Mixture of Rhubarb and Soda (bicarbonate of sodium 30, fluid extract of rhubarb 30, spirit of peppermint 30, water q. s. ad 1000 parts). *Dose*, fʒij–℥j.

Pulvis Effervescens Compositus (U. S. P.).—Compound Effervescing Powder, or Seidlitz Powder. *Dose*, one powder.

Trochisci Sodii Bicarbonatis (U. S. P.).—Troches of Bicarbonate of Sodium. Each, gr. iij. *Dose*, one or more troches.

Trochisci Sodii Santoninatis (U. S. P.).—Troches of Santoninate of Sodium. Each, gr. ij. *Dose*, one to five troches.

Sodii Nitris.—Nitrite of Sodium. *Dose*, gr. iii–xx.

Sodii Ethylas.—Ethylate of Sodium. For external use.

Pasta Londoniensis.—London Paste is prepared by rubbing together equal parts of caustic soda and unslaked lime. For external use.

* The commercial bicarbonate is used only for pharmaceutical purposes.

† Enters into the syrup of the hypophosphites (see p. 807).

Pharmacology.—The metal sodium, a monatomic, metallic element, Natrium (Na. = 23), was discovered by Sir Humphry Davy, in 1807, the same year that he succeeded in isolating the metal potassium, which, in many respects, it resembles. It is found only in the laboratory and in the arts, not being used in its own form in medicine. Many of its salts are officinal; they are generally white or colorless, soluble in water, and less irritant than the corresponding potassium salts. They tinge the light yellow, in the spectroscope, or when a small portion, on a piece of platinum wire, is held over burning alcohol. The chloride of sodium occurs native in sea-water and in salt-mines, and is found in all the fluids and solids of the human body. The urate of sodium is not soluble in water, and, therefore, when uric acid is formed in excess, deposits of urate of sodium are apt to occur in various portions of the body. The potassium and lithium salts with the uric acid, on the contrary, are soluble in water, and assist in carrying off from the system the less soluble uric acid. In gouty patients, therefore, soda-salts should be only cautiously given.

Physiological Action.—Soda, when locally applied, in concentrated form, to muscle or nerve, is a paralyzing agent, but to a decidedly smaller extent than potassa. Caustic soda in its action resembles caustic potash, but has less tendency to spread. Solutions of the chloride are antiseptic, and table-salt, as an article of food, plays a very important part in digestion and in tissue change. Weak solutions of salt (5 to 6.5 parts per 1000), if injected into the veins, do not affect the integrity of the red blood-corpuscles. The carbonate may be used in the same manner, to replace a quantity of blood lost by hæmorrhage, or in the collapse of cholera. Applied to the skin, solutions of the bicarbonate are cleansing and non-irritant; and, in cases of burns or scalds, insect-bites, or ivy poisoning, a saturated solution rapidly relieves pain. Borax is also antiseptic and unirritating to the skin. The hyposulphite is antiseptic by virtue of the sulphuric acid which it contains. The ethylate of sodium is also an antiseptic, and decidedly caustic. Liquor sodæ is a valuable antacid, without affecting nutrition as much as potassa does, and it is less poisonous to the heart and nerves. The acetate, being the salt of an organic acid, becomes converted into the carbonate in the blood; it is diuretic, although to a less extent than the potassium acetate. Carbonate of sodium is used in pharmacy in preparing other salts; as it is a good alkali for combining with grease or fat, it is found in every household as "washing-soda." The bicarbonate is used as an antacid when there is an excess of acid in the stomach; given when the stomach is empty, it stimulates the secretion of gastric juice; it also increases the alkalinity of the blood, reduces the acidity of the urine, and relieves irritability

of the bladder. The chloride is a very convenient emetic, especially combined with mustard-water. Hæmorrhages are sometimes checked by it through reflex influence. The nitrate is refrigerant in fever, and increases the secretions of the intestinal tract. The nitrite acts like the other nitrites, in depressing the heart's action and reducing blood-pressure. The sulphate is a bad-tasting and harsh cathartic; it is a common constituent in purgative mineral waters, where its effects are enhanced and modified by natural combination.

In recent experiments undertaken to determine the influence of alkalies on the excretion of uric acid, made by Dr. Spilker, under the direction of Prof. Salkowski, it was found that the addition of alkalies to the diet diminishes the excretion of uric acid, or, rather, its formation in the human subject, while in the dog the reverse was the case.* This should teach us to accept, with some reserve, the deductions from physiological experiment in the laboratory, with regard to the action of medicine upon the lower animals, especially where they conflict with clinical teaching and the results of experience.

Therapy.—Soda, which is a corrosive poison in concentrated form, the symptoms and treatment being the same as for poisoning by the corresponding potassium salts, may be used locally as a substitute for caustic potash, being more manageable and less severe. A combination of equal parts of soda and lime, known as London paste, is a favorite caustic application, especially for the removal of morbid growths, by some practitioners. Garretson employs London paste as follows for the removal of tonsil-glands, as well as for the destruction of certain warts:—

"To apply this agent, the practitioner uses enough water to convert the powder into a thick paste, which he directs against the body to be removed by means of the cup found upon the handle of a director. Each application secures a certain extent of slough. Five or six repetitions are necessary. London paste worked into the interstices of seed-warts allows of their being brushed off in a couple of minutes. Return is uncommon." The ethylate of sodium is one of the most powerful caustic preparations that can be used. It combines with water of the tissues, and continues to act deeply in abstracting this element. It is serviceable in destroying warts and various morbid growths, but is liable to leave the skin scarred on account of its destructive action upon the tissues. The writer has employed ethylate of sodium with great benefit in lupus erythematosus and vulgaris; likewise in callous ulcers, epithelioma, and in thickened and ulcerated spots of syphilis. If the ethylate of sodium is used for the removal of excessive growth of hair, especially upon the face (polytrichia), as has been recommended by

* Therapeutic Gazette, October 15, p. 706, 1890.

Jameson, the physician may expect, from the observations made by the author, more or less scarring of the skin on account of the destructive action of this caustic upon the true skin and deeper structures. Sodium bicarbonate, in powder or solution, is applied to burned or scalded surfaces, and quickly relieves pain. It can also be used to subdue inflammation in sun-burn, rhus poisoning, pruritus, eczema, insect-bites, etc. Borax acts very similarly, but is more antiseptic on account of containing boric acid. Both of the foregoing are also employed in solutions for washing out the bladder in cystitis, for injecting into the auditory canal to remove cerumen from the ear, and for intra-venous injection in collapse from cholera, etc. The following combinations containing one of the sodium preparations will be found serviceable :—

℞ Sodii bicarbonatis, ... ℥ss.
Aquæ camphoræ,
Aquæ menth. pip., ... āā f℥iv.

M. Sig.: For itching and burning of the mucous membrane and skin in the various eruptions upon the integument.

℞ Liq. sodæ chloratæ, ... fʒj vel ʒiij.
Tinct. kino, ... f℥ij.
Aquæ, ... f℥iij.

M. A disinfectant gargle for ulceration of the throat.

℞ Sodii benzoat., ... gr. xx.
Creasoti, ... ♏v.
Glycerini,
Aquæ rosæ, ... āā f℥ss.

M. Employ with an atomizer in nasal catarrh, pharyngitis, and in laryngitis.

℞ Sodii bicarbonatis, ... ʒiij.
Glycerini,
Aquæ hamamelidis dest., ... āā f℥iij.

M. To allay itching and burning of the skin, especially in eczema, lichen, urticaria, dermatitis, burns, and frost-bite.

In acute tonsillitis, sodium salicylate may be rubbed upon the tonsils with the finger, with excellent results. In this affection a solution of the bicarbonate has been beneficial, applied upon a brush or mop, or used as a gargle. For catarrhal conditions, chronic bronchitis, etc., a solution of this salt may be used with the steam-atomizer, with hamamelis, belladonna, or other combinations if desired. The chlorate of sodium is recommended by Prof. Traill Green, of Easton, to be used in place of chlorate of potassium in acute affections of the throat or fauces. A 2-grain lozenge made with tragacanth is just as efficient, locally, as the officinal potash-lozenge, and will not cause depression of the heart like potash. In children suffering with oxyuris vermicularis, or seat-worm, injections of chloride of sodium solution will bring away the parasites

and relieve the itching. The sulphocarbolate is useful as a disinfectant, being less irritant and not caustic; but for internal use the salicylate is safer. The bicarbonate of sodium is used as an antacid in gastritis and sour stomach, and affords temporary relief, especially in combination with mint or rhubarb. The bicarbonate, with rhubarb, is especially useful in cases of catarrhal jaundice. The bicarbonate of sodium is of benefit when the urine is acid, and in all forms of cystic irritation, and is especially useful in renal calculi, cystitis, gonorrhœa, gleet, stricture, and in enlarged prostate. The following prescriptions, containing the bicarbonate of sodium, are recommended:—

℞ Sodii bicarbonatis, ... ʒiiiss.
Tinct. zingiberis,
Tinct. capsici, ... āā fʒj.
Tinct. nucis vomicæ, ... ♏cc.
Tinct. gent. comp., ... q. s. ad f℥v.
M. Sig.: Two teaspoonfuls in water, three times a day, in acid dyspepsia.

℞ Sodii bicarbonatis, ... ʒiiss.
Glycerini,
Aquæ menth. pip., ... āā f℥ij.
M. Sig.: Two teaspoonfuls after meals, in acid dyspepsia.

℞ Sodii bicarbonatis, ... ʒj.
Pulv. ipecacuanhæ et opii, ... gr. xl.
M. et ft. chartæ no. xx.
Sig.: A powder every two or three hours, for cystitis or irritable bladder or prostate.

℞ Sodii bicarbonatis, ... gr. xl.
Hydrargyri chloridi mitis, ... gr. ij.
M. et ft. chartæ no. xij.
Sig.: A powder every two or three hours, for acute gastritis.

When used as an antidote to acids in corrosive poisoning, the carbonate is better than the bicarbonate, on account of there being less carbon dioxide formed. The hyposulphite is a useful antiseptic in sarcinous vomiting and infectious dyspepsia. Sodium phosphate, on account of its cholagogue effects, is useful in cases of inaction of the liver in children who pass clay-colored stools.

The sodium acetate is not as deliquescent as potassium acetate, and has this advantage over the latter salt. It has been given with benefit as an antacid in acute rheumatism, and as a diuretic in dropsies. Sodium acetate is likewise serviceable in gout, and in the treatment of irritation of the genito-urinary apparatus. The appended prescription is suggested:—

℞ Sodii acetatis, ... ʒiij.
Syr. aurantii, ... f℥iij.
Spiritus ætheris nitrosi, ... f℥ij.

M. Sig: Two teaspoonfuls in water, every two or three hours, for rheumatism, gout, or genital irritation.

Sodium benzoate is a safe and effective antipyretic. It has been employed for its antiseptic virtues in phthisis, diphtheria, the eruptive fevers, and in irritation of the genital organs. The following combination of sodium benzoate is recommended:—

℞ Sodii benzoatis, ... ʒiij.
Ext. tritici repentis fl.,
Ext. buchu fl., ... āā f℥iss.

M. Sig.: A teaspoonful or two, every two or three hours, for cystitis, or for an irritable bladder and prostate.

The pulvis effervescens compositus (U. S. P.), or Seidlitz powder, is a mixture taken while effervescing, containing 40 grains sodium bicarbonate and 2 drachms of Rochelle salt (blue paper) and 35 grains of tartaric acid (in a white paper).* The contents of each paper are dissolved in a wine-glassful or more of water, and drunk while effervescing, to relieve simple constipation. In obstinate vomiting, small doses of Seidlitz powder are often efficient in overcoming the nausea and retching. A teaspoonful of chloride of sodium, dissolved in a tumblerful of water and taken before breakfast, will often answer the same purpose as some mineral waters.

The **salicylate of sodium** is used very largely in the treatment of acute rheumatism, and rheumatic throat inflammation, pyrexia of influenza, etc. In acute rheumatism, about 2 drachms a day, in divided doses, relieve pain and fever and make the patient more comfortable. (See page 387.) Sodium salicylate, mixed with theobromine, has such diuretic effects that it has been called **diuretin,** of which the dose is a drachm, or a drachm and a half, daily, in divided doses. (See Theobroma.) Good results may be obtained in fevers, by using the fluid extract of erythroxylon coca to sustain the heart's action and support strength, at the same time that the salicylate of sodium is used to keep down temperature. The nitrate of sodium, in doses of 3 or 4 grains, is recommended by Pearce as serviceable in asthma.

SOLANUM PANICULATUM.—Jerubeba.

Preparation.

Extractum Solani Paniculati Fluidum.—Fluid Extract of Solanum Paniculatum (from the root). *Dose*, ♏v–xxx.

Pharmacology.—Solanum paniculatum (Solanaceæ), or jerubeba, is a common, shrubby plant, which grows in the wild country of the North of Brazil. It has a woody stem, and reaches a height of 8 or 10 feet. The stem, branches, and under side of the leaves are almost covered by a white, downy hair. An alkaloid, termed **Jerubebin,** has been found in the fruit and the root.

* These may also be put up without Rochelle salt, and were formerly officinal in this shape as soda-powders, or Pulveres Effervescentes (Ph., 1870).

Physiological Action and Therapy.—The effects of jerubeba upon frogs and guinea-pigs have been investigated by Duprat. Torpidity soon came on after hypodermatic injection of a hydro-alcoholic extract, and reflex movements disappeared. Respiration was retarded, and the action of the heart slow and irregular. Jerubeba is an excellent laxative, and is said to be valuable in the treatment of habitual constipation. The drug is held in great esteem in Brazil, where it is considered tonic and alterative.

SOLIDAGO.—Solidago, Golden Rod.

Dose, gr. xxx–ʒij.

Pharmacology.—The Solidago odora (Compositæ), or fragrant golden rod, is a conspicuous feature of autumn landscapes in the northern United States. It has many varieties, but the usual form bears a terminal spike, or one-sided raceme, of yellow flowers. The plant is yellowish green, fragrant, and yields, by distillation, a **volatile oil,** resembling anise in odor. The fluid extract, made with dilute alcohol as a menstruum, is often used as a flavoring excipient. A solid extract may be obtained by evaporating the fluid extract to the proper consistence and incorporating with it one-twentieth of its weight of glycerin.

Physiological Action.—Golden rod is carminative and gently stimulant. The hot infusion produces diaphoresis and relieves the pains of dysmenorrhœa.

Therapy.—This drug is scarcely used by the profession, but possesses some, though not very decided, medicinal value. The decoction and warm infusion are used in domestic practice to produce diaphoresis, to relieve colic, and to promote menstruation. The oil may be used for similar purposes, and also as a carminative to relieve flatulence, etc.

SOMNAL.—Ethylated Chloral-Urethan.

Dose, ♏xx–fʒss.

Pharmacology.—In 1889, Dr. S. Radlauer, of Berlin, brought to the notice of the profession a compound of chloral, urethan, and alcohol, which he considered a definite compound and not a simple mixture of these substances. It is a colorless liquid, resembling chloroform in appearance; very slightly, if at all, soluble in cold water, but soluble in hot water and in alcoholic solutions. The odor is faint, resembling spirit of nitrous ether; the taste is very pungent. For administration it requires free dilution, and can be given with simple elixir, whisky, or syrup of liquorice.*

Physiological Action.—Dr. W. Gilman Thompson,† from a series of

* "Somnal: a New Hypnotic," by Frank Woodbury, M.D., Dietetic Gazette, July, 1890.

† New York Medical Journal, November 29, 1890.

experiments, both physiological and clinical, concluded that "the effects of somnal are much more striking and certain than those of urethan, and far less depressing than those of chloral. There is no vertigo or depression after taking somnal, such as may follow the use of sulphonal. The action of somnal is usually very prompt, and doses of ½ drachm, disguised in a little syrup of tolu or whisky, are always well borne, easily taken, and entirely without deleterious effect. The drug, in doses of a drachm, is not powerful enough to decidedly control delirium tremens, maniacal delirium, or severe pain. In doses of 30 or 40 minims somnal is a safe and reliable hypnotic for ordinary insomnia." The blood-pressure is increased under somnal instead of being depressed, as it is after taking chloral. It does not disturb digestion, and does not affect the pulse or temperature. An adverse opinion regarding this substance has been published* by Dr. Langgaard, who maintains that its narcotic effect is less than that of chloral, appears later, and is of shorter duration. Langgaard affirms that respiration and circulation are affected in the same manner, and, at least, as energetically as by chloral hydrate. The blood-pressure sinks, in rabbits, to 40 millimetres (15¾ inches) of mercury, or even lower, after doses that only produce two hours' light sleep.

Therapy.—Somnal, as generally observed by all who have used it, is a valuable hypnotic for cases of simple insomnia and sleeplessness after acute diseases, delirium tremens, parturition, etc. It should not be used in chronic interstitial nephritis and endarteritis with abnormally high tension, as it would increase the latter condition. Pain or cough is not much affected, though soothed by the sleep produced. Out of 54 various cases coming under Dr. Thompson's care, it produced sleep in about 50 per cent. within fifteen minutes, and in 43 cases out of 54 within an hour. In 6 cases only did it fail to produce sleep, and in some of these it had a quieting and soothing effect. In an obstinate case of insomnia in a business man, Dr. Geo. H. Pierce administered 40 drops of somnal at a dose, in milk, and the patient slept for fourteen hours and wakened refreshed; previously he had run the gamut of the usual hypnotic remedies without benefit. The continuance of somnal for a short time entirely cured him and overcame a habit which had been formed for years. Owing to its comparative innocuousness it may be used in combination with syrup of tolu for fretful infants during dentition.

SOZOIODOL.—Di-iodo-phenol-sulphuric Acid.

Pharmacology.—From phenol is derived, by combination with iodine and sulphuric acid, the remarkable substance, sozoiodol, which was first

* Süddeutsche Apotheker-Zeitung, November 21, 1889; Medical Bulletin, February, 1890, p. 56.

discovered by one of our own countrymen in San Francisco; but it was not until its manufacture was conducted upon a larger scale in Europe that it could be obtained sufficiently pure for medicinal use. The components of this remedy would indicate its value; it contains 55 per cent. of iodine, 20 per cent. of phenol, and 7 per cent. of sulphur. It forms salts with alkalies and with metals; those most used are potassium, sodium, mercury, and zinc. As manufactured in this country by the Mallinckrodt Chemical Company, of St. Louis and New York, in a pure form, the salts are generally perfectly white, odorless, and vary in solubility, the mercury salt being the least soluble. The potassium salt, with 2 parts of talc or other inert vehicle, may be used as a substitute for iodoform, being free from all the objectionable features of the latter drug.

Physiological Action.—The sozoiodolates of sodium and potassium are non-irritating, and may be used in full strength as antiseptics and slight astringents. The mercurial and zinc salts are more active, and are used in solution (10 to 20 per cent.) for the same purposes. In solutions ranging in strength from ½ to 2 per cent., sozoiodol and its combinations are destructive to the micro-organisms of suppuration. Sodium-sozoiodol has been given to rabbits in doses of 1 gramme (15½ grains) without producing any toxic effect. Sozoiodol is not decomposed within the body, but passes through the organism unchanged. According to Buffalini, the quantity of urea eliminated after the ingestion of sozoiodol is materially diminished, though the quantity of urine is increased.

Therapy.—As a topical application in uterine catarrh or ectropion, Nitschmann praises the soda salt, which is to be blown directly on the cervix and a dry tampon placed over it. He also uses a 5- to 7- per-cent. solution in rhinitis hypertrophica, ozæna, acute coryza, and in inflammations of mucous membranes generally, applied in a douche or by means of a camel-hair brush.

A 5-per cent. sodium sozoiodol solution has proved to be useful as a collyrium in acute purulent conjunctivitis and in ophthalmia neonatorum. The combination with zinc is commended in chronic inflammation of the ear and upper air-passages. Dr. Seifert, of Würzburg, has obtained satisfactory results in tuberculous ulcers of the larynx from insufflation of sodium sozoiodol diluted with an equal bulk of some innocuous powder, such as sugar of milk. The sozoiodol combinations have been applied with success, it is said, to unhealthy wounds and ulcers, parasitic skin diseases, eczema, impetigo, burns, dermatitis, and cracked nipples. An interesting observation was made by C. Schwarz, who gave 2 grammes (31 grains) daily of sodium sozoiodol to a diabetic

patient without any restrictions as to diet. The symptoms at once improved, the urine and sugar diminished, and in two months not a trace of sugar could be found.* Buffalini tried the drug in phthisis (16 grains daily) without results.

The soda salt has been recommended as a substitute for carbolic acid or creasote in cases of infectious dyspepsia, and may be administered in daily doses of 1 to 3 grammes (15½ to 46½ grains). In the same dose lithium sozoiodol has seemed to be beneficial in several cases of articular rheumatism.

For insufflation in ozæna, rhinitis, and rhino-pharyngitis, the zinc and mercury compounds may be used, diluted with considerable excess of milk-sugar; the sodium and potassium salts may be employed pure or diluted to 3- or 10- per-cent. solutions. If a prolonged action is desired, the potassium salt is used, either alone (10 per cent.) or mixed with talć or sugar. In urethritis or vaginitis, the zinc sozoiodol, in 2-per-cent. solution, answers well as an injection, used several times a day.

SPARTEINE. See Scoparius, page 894.

SPECIES are mixtures of various comminuted vegetable drugs prepared for making extemporaneous infusions or decoctions, either by the dispensing pharmacist or the purchaser. Some are cathartic in their action, others diaphoretic and expectorant. They are often sold as "teas," on account of the manner of preparation.

SPERMINI HYDROCHLORAS.—Spermine Hydrochlorate or **Muriate.**

Dose, gr. ¼ to j, hypodermatically.

Pharmacology.—Spermine, according to Dr. G. Archie Stockwell, of Detroit (from whose excellent papers, in the *Therapeutic Gazette*, on Brown-Séquard's discovery, the following extracts are taken), is the true factor in inducing the physiological phenomena chronicled by M. Brown-Séquard, in his communication to the French Academy which created so much stir two years ago. It is obtained from the testicular juice of the lower animals by a carefully-conducted process, which protects the product from contamination by infectious micro-organisms and isolates it, chemically pure, as a salt of hydrochloric acid.

Physiological Action.—From experiments upon rabbits, Dr. Stockwell declares that it invariably produced powerful and prolonged stimulation of the sympathetic nervous system, most strongly manifested through the spermatic plexus. It stimulates the vasomotor centre, increases blood-pressure, and aids oxidation. In toxic doses it induces distressing tetanic spasm and interferes with respiration by spasmodic

* Annual of the Universal Medical Sciences, 1890, vol. v, p. A-124.

fixation of muscles, including the diaphragm. Cutaneous hyperæsthesia and increased muscular activity were observed. Sexual erethism was marked in many instances.

Therapy.—The hypodermic injection of an extract from the recent testicles of mammals was found by Brown-Séquard * to have a stimulating effect upon nutrition, and to be especially active as a restorative in failing nutrition due to old age. Dr. H. P. Loomis, of New York, found that the injections, "as claimed, produce nutritive modifications in the tissues of elderly men, due, probably, to stimulation of the nerve-centres." In tuberculosis this substance has also been recommended.† The injections were followed by relief in cases of insomnia, hypochondria, feeble heart, cardiac asthma, and spinal irritation, as reported by Dr. H. C. Brainerd, of Cleveland. Dr. Stockwell believes the subject deserves further investigation.‡

SPIGELIA (U. S. P.).—**Spigelia, Pink-Root.**

Dose, ʒi–ij, for an adult; gr. x–xv, for a child of 3 years.

Preparation.

Extractum Spigeliæ Fluidum (U. S. P.).—Fluid Extract of Spigelia. *Dose,* fʒi–ij.

Pharmacology.—Spigelia is named in honor of Adrien Spigelius, an Italian botanist of the seventeenth century. Medicinally it is the rhizome and rootlets of Spigelia marilandica (Loganiaceæ), growing in thickets from Pennsylvania to Illinois and southward. It has a scarpoid spike with funnel-shaped, sessile flowers, crimson externally and orange within, which appear in June. The roots contain a bitter principle, volatile oil, resin, etc., but which is the true active agent is not known.

Physiological Action.—Spigelia is a popular anthelmintic against round-worms. It has some cathartic action, but this is uncertain, and it is therefore usually administered with senna. When it does not produce purgation promptly, some symptoms of cerebral disorder, as vertigo, dimness of vision, strabismus, dilated pupils, even convulsions may appear. Therefore it is best to administer a dose of a saline, like magnesium sulphate, about two hours after taking spigelia.

Therapy.—This remedy ranks among the best of our agents for the destruction of lumbricoid worms.

The combined extracts of spigelia and senna (5 to 3), with aromatics, were formerly officinal, the dose being 1 or 2 fluidrachms. In this

* See paper by the author on "The Case of Dr. Brown-Séquard," The Times and Register, November 30, 1889.

† See lecture by Dr. D Uspenski, on "Brown-Séquard Fluid in Tuberculosis," in Deutsche Medizinal Zeitung, December 29, 1890.

‡ "Historical, Critical, and Scientific Aspects of Brown-Séquard's Discovery—the So-called Elixir," The Therapeutic Gazette, vol. v, p. 819; vol. vi, p. 14.

combination the narcotic effects are obviated. An objection to this remedy is its color, which stains the child's clothing if it should vomit or have loose passages.

The Spigelia anthelmia, in structural characteristics, resembles spigelia, but has insignificant, greenish-red flowers; the root is short and divided into long rootlets. It is an annual and a native of South America and the West Indies. Its constituents are unknown.

Full doses cause vomiting, diarrhœa, giddiness, stupor, dilated pupils, tremors, muscular contractions, convulsions, dyspnœa, and death. It is an acrid, narcotic poison. It has been employed as a vermifuge; and also in rheumatic affections of the heart and pericardium, and of the eye. In palpitation of the heart accompanying valvular disease, it has been used with asserted success in 10-minim doses of a tincture (12 per cent.).

STAPHISAGRIA (U. S. P.).—**Stavesacre.**

Dose, gr. i–iij.

Pharmacology.—The seeds of Delphinium staphisagria (Ranunculaceæ), growing along the Mediterranean, contain several alkaloids, the most important being **Delphinine, Delphisine,** and **Delphinoidine.** They also contain a bland fixed oil, which, when extracted by ether, is apt to be contaminated by the alkaloids. There are no officinal preparations, but an ointment (20-per cent.) and a fluid extract are used.

Physiological Action.—Stavesacre is used principally for killing vermin. It is irritating to the skin, producing erythematous inflammation when locally applied; a narcotic poison when taken internally, lowering the action of the heart, causing profound depression of the vital power and spinal paralysis, with death from asphyxia. A fatal result has even attended its local application to the scalp, when used too freely in a child.

Charalampi (Inaug. Dissert. Dorpat) found that, although delphinine and delphisine have the same chemical composition, they differ slightly in their behavior to water, alcohol, ether, and benzol, but still more in their physiological effects. Delphinine has an acrid, benumbing taste, while delphisine is bitter, leaving a burning sensation on the tongue. Delphinoidine, which is amorphous, has a bitter, scarcely acrid taste, is soluble in ether, and yields amorphous salts, which are soluble in water. The mixture of principles insoluble in alcohol, which has been known hitherto as **Staphisagrine,** consists of at least four alkaloids, all of which are amorphous and have a bitter taste. The physiological action of the different alkaloids was determined by Professor Kobert. He found that they do not dilate the pupil; otherwise they resemble aconite, though decidedly weaker, differing among themselves in their effects. Delphinine

shows a very close relation to aconitine. The lethal dose for cats is $\frac{1}{40}$ grain of delphinium or $\frac{1}{120}$ grain of delphisine; of delphinoidine the lethal dose was also $\frac{1}{120}$ grain, but it was more decidedly narcotic in its action.*

Therapy.—The use of stavesacre in medicine is restricted almost entirely to its effects as a parasiticide. The dry powder may be dusted over the affected surface, for head- or body-lice, or the following formula employed, which has been highly recommended:—

℞ Ext. staphisagriæ fl., ... f℥ij.
Acid. acetici dilut. (vel aceti), ... q. s. ad f℥vj.
M. Sig.: For pediculosis. If applied several times a day, usually effects a cure in two days.

The ointment may be used in scabies as a parasiticide, but its common employment is for the destruction of pediculi. Care should be taken not to apply it too freely, and to remove it at once upon the appearance of toxic symptoms. The oil has also been used for this purpose. Squire recommends the oil of stavesacre diluted with olive-oil. As suggested by Professor Leidy, any bland oil would answer the purpose, as lice are air-breathing insects, and are suffocated by being immersed in oil; poison is therefore unnecessary. An ointment consisting of 1 part of the oil of stavesacre to 7 parts of lard has been found efficacious in prurigo senilis. **Delphinine** has been employed in painful affections, as in neuralgia, where an ointment (gr. x–xx to ℥j) may be applied over the course of painful nerves. Given internally (gr. $\frac{1}{10}$ to $\frac{1}{8}$), it was found to act as a cardiac sedative and to relieve excitement in acute rheumatism by von Mering. It has also been used in asthma and as an antipyretic in the same doses. A decoction of stavesacre-seeds has sometimes proved useful as an anthelmintic, and Phillips† has known the tincture apparently useful in long-standing amenorrhœa and also in the nausea of pregnancy.

STERCULIA. See Kola-Nut, page 718.

STILLINGIA (U. S. P.).—Stillingia, Queen's Root.

Preparations.

Extractum Stillingiæ Fluidum (U. S. P.).—Fluid Extract of Stillingia. *Dose*, ♏x–fℨj.

Extractum Stillingiæ Fluidum Compositum (stillingia 130, corydalis 130, chimaphila 60, iris 60, sambucus 60, xanthoxylum-berries 30, and coriander 30, to make 500 parts fluid extract with dilute alcohol). *Dose*, fℨi–ij.

Syrupus Stillingiæ Compositus.—Compound Syrup of Stillingia (compound fluid extract 1 to simple syrup 3 parts). *Dose*, fℨj–℥j.

Tinctura Stillingiæ.—Tincture of Stillingia (10 per cent.). *Dose*, fℨss–j.

Decoctum Stillingiæ.—Decoction of Stillingia (1 to 16). *Dose*, f℥i–ij.

* American Journal of Pharmacy, August, 1890.
† *Op cit.*, p. 48.

Pharmacology.—The root of Stillingia sylvatica (Euphorbiaceæ), an indigenous perennial, growing in the southern portion of the United States. The most noteworthy constituent is a soft resin, but it also contains a bitter, acrid principle and some volatile oil.

Physiological Action.—When taken in rather large doses, this drug acts as a severe cathartic and emetic. In small doses, frequently repeated, it is believed to stimulate various secretions so as to warrant its being considered alterative. It is also regarded as a stimulant to the heart and circulation.

Therapy.—Stillingia has been employed as an alterative in syphilis, scrofula, and liver disorders. In the former it is often combined with sarsaparilla. In jaundice, hæmorrhoids, constipation, and disordered digestion from insufficient action of the liver, stillingia is valuable.

It has likewise been recommended in the first stage of hepatic cirrhosis and in ascites due to that disorder. Intermittent fever being frequently associated with torpid or deranged liver, the combination of this drug with antiperiodic treatment is very successful. The compound fluid extract is a good vehicle and adjuvant for potassium iodide in syphilis, chronic rheumatism, etc. In various cachectic skin disorders also this combination is useful.

STRAMONIUM.—Stramonium, Thorn-Apple.

Stramonii Folia (U. S. P.).—**Stramonium-Leaves. Dose,** gr. i–v.

Stramonii Semen (U. S. P.).—**Stramonium-Seed. Dose,** gr. ss–ij.

Preparations from the Seed.

Extractum Stramonii (U. S. P.).—Extract of Stramonium. *Dose*, gr. ¼–½.
Extractum Stramonii Fluidum (U. S. P.).—Fluid Extract of Stramonium. *Dose*, ♏i–v.
Tinctura Stramonii (U. S. P.).—Tincture of Stramonium (10 per cent.). *Dose*, ♏x–xx.
Unguentum Stramonii (U. S. P.).—Ointment of Stramonium (extract, 10 per cent.).
Daturina.—Daturine. Identical with Atropine. *Dose*, gr. $\frac{1}{120}$.

Pharmacology.—The leaves and seed of Datura stramonium (Solanaceæ) are each officinal, but no preparations of the leaves are recognized by the present edition of the pharmacopœia on account of their variability in strength. The plant is an annual with green stem, coarse, rank-smelling leaves, and white flowers; the seed-capsule is green and fleshy. It grows wild in Europe and the United States, being commonly known here as Jamestown weed (Jimsun weed), or thorn-apple. The last name is unfortunate, for when the seeds are eaten by children poisoning occurs, sometimes with fatal results.* It contains an alkaloid, **Daturine** (0.02

* Pellicini (Il Progresso Medico) reports five cases of poisoning in one family owing to the use of a decoction for a cough. The patients recovered under the use of caffeine, morphine, black coffee, and camphor.

to 0.03 per cent.), which appears to be chemically and physiologically the same as atropine of belladonna, but is said to be twice as strong (Oldberg and Wall).

Physiological Action.—The physiological properties of stramonium are the same as those of belladonna, except that the sympathetic nervous system is more influenced by stramonium, the heart becoming irregular and more delirium being manifested under its use. It is held to be aphrodisiac in full doses. Stramonium is eliminated from the system by the kidneys. The toxic effects are not very different and the treatment is the same as for belladonna poisoning. (See page 468.)

Therapy.—The leaves of stramonium are sometimes used locally, in a poultice or fomentation, as an anodyne for engorged breasts, tumors, rheumatic joints, sprains, etc. The ointment is used for irritable ulcers, cancer, hæmorrhoids, fissures, and painful affections, especially around the anus. It is much better if made from the extract of the fresh leaves. When dried, they may be mixed with tobacco and smoked for asthma, the fumes being inhaled so as to enter the bronchial tubes, an attack being checked or materially alleviated in this manner. Some relief may be afforded in the same way, in a case of biliary colic and the passage of a stone along the ureter, or gravel. About 15 grains may be mixed with an equal quantity, or more, of tobacco and smoked in a pipe, or made into a pastille, with a little nitre, and moistened with alcohol, or burned on a hot shovel in a close room. Stramonium has likewise been administered internally in asthma with some success, but its action is much more uncertain when taken by the mouth than when inhaled.

In mania of acute character, puerperal or other, the tincture should be given in decided doses, every two to four hours, until physiological symptoms are manifested. In spasmodic neuralgia (tic douloureux) and various forms of visceral neurosis, dysmenorrhœa, etc., stramonium may be combined with other agents of the same group, or with opium.

In spasmodic cough, the tincture might be used as a substitute for belladonna, in small doses. Stramonium is sometimes given with advantage in chorea, epilepsy, and nymphomania. The remedy seems especially beneficial when the last-named affection is associated with depressed spirits. Chronic rheumatism is not infrequently benefited by the internal use of stramonium.

STRONTIUM.—Strontium.

Preparations.

Strontii Bromidum.—Dose, gr. x–xx.
Strontii Iodidum.—Dose, gr. x–xx.
Strontii Lactas.—Dose, gr. x–xx.

Pharmacology.—Strontium combines freely with other elements, forming a long list of salts. The bromide, iodide, and lactate are freely soluble in water; the phosphate is insoluble.

Physiological Action.—The effects of strontium were but little known until the investigations of Dr. J. V. Laborde, who reported his results to the Academy of Medicine, at the meetings of July 21 and 28, 1891. His experiments were made upon dogs and, in one instance, upon the human subject. He found that large proportionate doses of bromide, chloride, carbonate, and lactate of strontium could be administered without producing any deleterious effects. The lactate gave rise, in the dog, to marked diuresis. M. Ch. Féré, in an independent investigation relative to the comparative toxicity of the bromides when given by intra-venous injection, ascertained that, in the rabbit, the bromide of potassium is about five times as toxic as the bromide of strontium. Strontium increases the appetite, digestion, and assimilation of animals. Its salts retard fermentation and putrefaction, and act as intestinal antiseptics. Laborde attributes to them an anthelmintic effect. The combinations of strontium are partially eliminated in the urine and fæces, but a portion is retained within the economy and deposited in the bones, liver, and, to a less extent, in the soft tissues.

Therapy.—The bromide of strontium has been used with satisfactory results in epilepsy. It is well borne by the stomach, and has not as yet been productive of any of the phenomena of bromism. The paroxysms of hystero-epilepsy have also been controlled by this salt. The digestive disturbances accompanying disease of the heart and kidneys are notably ameliorated by this salt. The writer has witnessed marked relief follow its administration in nervous dyspepsia and gastralgia. In dyspepsia associated with excess of hydrochloric acid the bromide of strontium produces rapid and decided relief. It has also proved efficacious in cases where the acid was deficient. In nervous vomiting and dilatation of the stomach it is also beneficial. The writer observed improvement follow the use of the bromide in chorea. This salt also afforded signal relief in senile pruritus. The lactate of strontium is of decided service in albuminuria. It generally causes a rapid reduction of the albumin, but its administration should not be too soon suspended. Strontium is not a positive diuretic in man, though in several cases the writer has seen a pronounced diuretic effect from the use of the lactate. The lactate is efficacious in scrofulous, gouty, and rheumatic nephritis, in the albuminuria of pregnant and puerperal women, and in that of cardiac origin, but is of no service after the manifestation of uræmia. The lactate of strontium is of utility in subacute or chronic gout and rheumatism. In eczema dependent upon Bright's disease and psoriasis due to a rheumatic diathesis the lactate

of strontium effects improvement. It is advantageous in chronic gastric and intestinal catarrh. The iodide of strontium is much better tolerated than the iodide of potassium, and is not apt to give rise to gastric irritability or eruption upon the skin. This salt is an excellent remedy in certain constitutional disorders. It is valuable in the treatment of enlarged lymphatic glands, scrofuloderma, chronic abscesses, disease of bones and joints, in scrofulous otorrhœa, ozæna, or ophthalmia. Lichen scrofulosum, strumous acne and eczema, and other affections of the skin occurring in scrofulous subjects, are improved by the administration of the iodide of strontium. It is likewise beneficial in chronic eczema with excessive infiltration and thickening of the skin. It is a good systemic remedy in lupus vulgaris and in the early stage of tuberculosis.

Rheumatic manifestations often yield promptly to the iodide of strontium. It is of particular service in chronic, subacute, and muscular rheumatism. Sciatica and trifacial neuralgia dependent upon a rheumatic basis will often yield to this remedy. It is likewise of avail in chronic and subacute gout. Eczema, erythema multiforme, erythema nodosum, purpura rheumatica, psoriasis, and paræsthesia, caused by gout or rheumatism, are benefited by the use of this salt. The writer has seen good results from its employment in large pustules of the scalp, tubercular syphilide, and in all the later manifestations of syphilis. Iodide of strontium is useful in chronic bronchitis, asthma, chronic catarrhal pneumonia, and chronic pleurisy. It will probably be found of avail in the first stage of cirrhosis of the liver or kidney. It is useful in chronic lead or mercurial poisoning. It may be employed in aortic aneurism, and Germain Sée recommends it in various affections of the heart.

STROPHANTHUS HISPIDUS.—Strophanthus.

Preparation.

Tinctura Strophanthi.—Tincture of Strophanthus (5 per cent.). *Dose,* ♏ii–xv.

Pharmacology.—The Strophanthus hispidus (Apocynaceæ) is a climbing plant of western Africa, from which the natives make a toxic extract known as the Kombé arrow-poison. There are several varieties of strophanthus, but the above is believed by Kirk to be the one used in medicine. Important communications relative to the different varieties of hispidus and their distinctive alkaloïds were made by M. Gley to the Biological Society of Paris, at the sessions of November 8, 1889, and February 22, 1890.* According to M. Gley, while strophanthus hispidus is used by the natives of the western coast of Africa, the Somalis of the

* Le Progrès Médical, November 16, 1889, and March 1, 1890; Medical Bulletin, March, 1890, p. 92, and June, 1890, p. 218.

eastern coast, for similar purposes, make use of the juice of another species. Products brought from these two different parts of the African coast by M. Arnaud, of the Museum, yielded upon examination the same active principle, which is termed **ouabaïne.** In South Africa is found a third Apocynum, Strophanthus Kombé, the seeds of which yield a second principle, **strophanthine.** M. Arnaud states that the chemical composition of strophanthine is very analogous to that of ouabaïne, The substance isolated by Arnaud is regarded as the only genuine strophanthine. Ouabaïne is a transparent, white, crystalline powder, slightly bitter; soluble with difficulty in cold water, but readily soluble in hot water; insoluble in chloroform and ether.

The active principle is **Strophanthin,** from which **Strophanthidin** may be derived by the action of sulphuric acid. Strophanthin is a crystallizable glucoside present in different parts of the plant, but especially in large proportion in the seeds (8 to 10 per cent.). It is bitter, acidulous. insoluble in ether and chloroform, but soluble in alcohol and in water. A good fluid extract would probably be the best preparation, but the effects of the tincture have been most observed by Professor Fraser,* of Edinburgh, who first introduced it to the profession in 1870. The active principle may be administered simply dissolved in water (gr. i–f℥j), the dose being gr. $\frac{1}{100}$ to $\frac{1}{60}$ (or 5 to 8 minims of the solution). Bartholow advises chloroform-water as a solvent, in order to prevent the formation of penicillium.

Physiological Action.—Strophanthus has no local action, apart from the observation of Steinbach that the seeds caused anæsthesia when applied to the cornea. This local action has been studied by Gley and is common to both ouabaïne and strophanthine, but is more decided in the former substance. Three or four drops of a solution of 1 to 1000 dropped into the cornea anæsthetize it for a considerable time, which may extend to several hours. The effects are unaccompanied by any irritation of the conjunctiva. Strophanthine and ouabaïne are much more powerful local anæsthetics than cocaine, and the anæsthesia which they produce is total, including all varieties of sensibility. The feeling of heat and cold is the last to be extinguished and the first to revive.

Strophanthus is bitter, and promotes appetite and digestion, if given in small doses. Its principal use is as a cardiac tonic, resembling digitalis. It slows the heart-beat, lengthens the intervals between the contractions, and increases the energy of the muscular tissue. Some effect is also seen upon the arteries, but the rise of blood-pressure is due principally to the increased force of the cardiac contractions. In fatal cases the heart's

* British Medical Journal, January 22, 1887, and Transactions of the Royal Society of Edinburgh, vol. xxxv, part iv (No. 21), 1890.

action is arrested in diastole. It has some diuretic power and it is claimed has no cumulative effect, but, as pointed out by Bartholow, this must depend upon the interval between the doses, for if they are given too frequently the effects must overlap each other. The action of ouabaïne and strophanthine upon the heart is identical. The prolonged use of strophanthus sometimes gives rise to diarrhœa.

Therapy.—Strophanthin has recently been employed as a local anæsthetic, administered percutaneously by means of cataphoresis, the anode being moistened with the solution, or a tissue-paper disk used containing $\frac{1}{250}$ grain or more and a current of 5 to 8 milliampères employed.* It is in cases of mitral disease not compensated where digitalis is not well borne, or in intervals of digitalis treatment, that strophanthus has been particularly praised. It lessens the ischæmia of the arteries and increases the rate of blood-current to the veins; but, unlike digitalis, it does not materially affect the calibre of the arteries, and consequently does not so much increase the work of the heart by contracting them. Strophanthus is especially useful in the progressive heart-failure of elderly patients, with attacks of dyspnœa simulating angina. Strophanthus is a serviceable cardiac stimulant in typhoid fever, and some authorities advocate its employment in angina pectoris. Cardiac dropsy is relieved by it. It can be prescribed thus:—

℞ Tinct. strophanthi,
Tinct. nucis vomicæ,
Tinct. cardamomi, ... āā f℥j.
Aquæ menth. pip., ... q. s. ad f℥v.
M. Sig.: A teaspoonful or two every two or three hours.

In the treatment of psoriasis, the author has had some good results, especially when the integument is much congested, from strophanthus, with hoang-nan:—

℞ Tinct. strophanthi,
Ext. hoang-nan fl., ... āā f℥ij.
M. Sig.: Ten to twenty drops in water three times a day.

Strophanthus is of advantage in bronchial asthma and whooping-cough. Dr. William Gemmel, of Glasgow, has made use of ouabaïne in 49 cases of whooping-cough.† He found it, when cautiously employed, to be of notable benefit in all stages of the disease. It is destitute of cumulative action. In an uncomplicated case it reduces the pulse, temperature, and respiration a little below the normal. Ouabaïne increased the activity of the skin. The bowels were unaffected. The excretion of

* Fortschritte der Medizin, February 1, 1890. Also see article by Frederick Peterson, M.D., on "A Farther Study of Anodal Diffusion as a Therapeutic Agent," Medical Record, New York, January 31, 1891.

† British Medical Journal, April 26, 1890, p. 950.

urine was slightly increased. The appetite and the general condition were considerably improved. Sleep was sound while ouabaïne was being administered. This substance was given in very small doses.

Dr. Gemmell states that the dose of ouabaïne, to begin with, should not exceed $\frac{1}{1000}$ grain every three hours ($\frac{1}{125}$ grain daily). For children under 1 year of age, not more than $\frac{1}{2000}$ grain should be given every three hours. From the sixth to the twelfth year, if the symptoms are severe, $\frac{1}{500}$ grain may be given in each dose, but the action must be carefully watched. Ouabaïne may be administered alone, dissolved in water, or in combination with potassium bromide or chloral hydrate. The simplest way is to dissolve 1 grain of ouabaïne in distilled water, so that each minim of the solution shall be equal to $\frac{1}{1000}$ grain of ouabaïne. Thus :—

℞ Liq. ouabaïn., ... ♏xlviij.
Syr. aurantii, ... f℥iv.
Aquæ, ... q. s. ad f℥vj.
M. Sig.: A teaspoonful, every three hours.

Rothziegel * recommends strophanthine in the treatment of respiratory diseases, according to the following formula :—

℞ Strophanthini, ... gr. $\frac{1}{20}$ vel $\frac{1}{12}$.
Aquæ destillatæ, ... f℥iiss.
M. Sig.: Ten to twenty drops, in capsules, every two hours.

The active principle of strophanthus may be administered hypodermatically, in doses of gr. $\frac{1}{100}$, not more than once daily. The hypodermatic injections are useful in chills, due to urethral shock, following passage of a sound or an operation; also in malarial or nervous chills. In Bright's disease, the symptoms of uræmia and dyspnœal attacks are rapidly relieved by strophanthus, which also reduces the dropsy of chronic kidney disorder. For exophthalmus, with irregular overaction of the heart (Graves's disease), it has been successfully tried. Dr. E. D. Ferguson † says that in 8 cases out of 9, to which he gave strophanthus in exophthalmic goitre, there was marked relief; the other one had preexisting pulmonary disease. He thinks it a probable explanation that strophanthus relieves the overtaxed heart by overcoming resistance in the systemic circulation. He advises beginning with doses of ♏viij, and gradually increasing them to ♏xxv, of a good tincture, several times daily.

Dr. Wm. A. Hammond, in a recent article in the *Therapeutic Gazette*,‡ on "Weak Heart and its Treatment," considers strophanthus

* L'Union Médicale, No. 140, 1890.

† Proceedings N. Y. Medical Association, October 22, 1890; Medical Record, November 1st, p. 592.

‡ Oct. 15, 1890, p. 668.

a valuable remedy, though inferior to digitalis, and states that it appears to him "to bear the same relation to digitalis that brucine does to strychnine, and when administered with a view to its tonic effect upon the heart it should be given in much larger doses than those ordinarily prescribed." Hare suggests its use in children, where digitalis does not answer well; but Demme holds the view that in children more care is needed in using strophanthus than in using digitalis,* stating that the toxic effect of strophanthus on the heart-muscle often occurs unexpectedly and more suddenly than with digitalis. In the case of very young children, Demme observed strophanthus to cause indigestion. If it cause nausea and cold-sweating, it should be withdrawn and coffee and brandy be administered. On the other hand, Moncorvo, of Rio Janeiro, also an excellent observer, values strophanthus as a cardiac stimulant and diuretic in the diseases of children. He considers it prompt and energetic, but devoid of danger, and claims that its good effects last long after the cessation of its administration.

STRYCHNINA (U. S. P.).—**Strychnine.** (See Nux Vomica, p 765.)

STYRAX (U. S. P.).—**Storax, Liquid Storax.**

Dose, gr. v–xx.

Pharmacology.—The inner bark of the Liquidambar orientalis (Hamamelaceæ), growing in Asia Minor, or oriental sweet gum, yields styrax, which is a true **balsam,** containing a volatile oil, **Styrol, Cinnamic acid, Styracin,** and other cinnamic ethers, two resins, etc. It enters into the compound tincture of benzoin (8 per cent.).

Physiological Action.—It is stimulant and expectorant.

Therapy.—Mixed with olive-oil, equal parts, storax is used in treating scabies, and in some cutaneous diseases requiring slight stimulation. Storax is a good application to foul ulcers, and, made into an ointment, is an excellent dressing to the ulcers of frost-bite. It is a stimulating expectorant in chronic bronchitis, generally used, however, in combination, both internally administered and by inhalation, the tincture being volatilized by hot water. Storax has also been brought forward as a remedy for gonorrhœa and gleet, also for chronic catarrhal affections of the genito-urinary organs, and it has been found useful in amenorrhœa. **Styrone,** a derivative of styracin, which is resolved by caustic potash into a cinnamate and cinnamic alcohol or styrone, is a very efficient antiseptic, and its use has been enthusiastically advocated by its introducer, Dr. H. H. A. Beach,† who

* Annual of the Universal Medical Sciences for 1890, vol. v, p. A-126.

† "Styrone: A Consideration of its Value as an Antiseptic," by H. H. A. Beach, M.D Boston Medical and Surgical Journal, August 1 and 8, 1889.

based his observations upon numerous surgical cases treated by him in the wards of the Massachusetts General Hospital.

It is a prompt deodorizer of foul wounds or ulcers,—malignant or not,—and in bronchial catarrh it can be used in a spray :—

℞ Styron., ... ʒj.
Glycerini,
Aquæ destillatæ, ... āā f℥j.
M. For external application.

Being non-poisonous, styrone can be used in emulsion with olive-oil or water for injecting into cavities, as after the operation for empyema; and, having an agreeable, cinnamon-like odor, it has been utilized in dentistry. Various combinations of styrone are suggested, as with liquid vaseline (ol. petrolati), 1 to 12, which was used with success upon the dressings as an antiseptic, after removal of the female breast.

Dr. Beach suggests the internal use of styrone in treatment of cholera for the disinfection of the alimentary canal. It may also be substituted for carbolic acid in gargles, requiring antiseptic action, and probably would be a useful enema for oxyurides, or ulceration of the rectum. A solution of 1 to 60, containing a small amount of glycerin, would be well suited for internal use. Styrone is likewise an excellent deodorant and disinfectant in cases of purulent inflammation of the ear.

SUCCINUM.—Amber.

Preparation.

Oleum Succini (U. S. P.).—Oil of Amber (a volatile oil obtained by the destructive distillation of amber and purified by subsequent rectification.) *Dose*, ♏v–xx.

Pharmacology.—Amber is a resin found among fossil alluvial deposits in different parts of the world, representing the resinous exudation of a number of varieties of extinct coniferous trees. The amber consumed in this country is brought from the ports of the Baltic, but it has been found in small quantities in New Jersey and Maryland. It is a light-yellow, brittle solid, in irregular masses, resembling colophony. Water and alcohol scarcely act on it. It becomes negatively electrified by friction. By distillation, oil of amber and succinic acid are obtained, and by repeated distillations from nitric acid it yields a liquor from which ether separates pure camphor. Amber consists of a volatile oil, a yellow resin, another resin, succinic acid, and a bituminous principle, the latter constituting about 80 per cent. It also contains a yellow coloring matter. The oil of amber is largely adulterated, and has fallen almost completely into disuse.

Physiological Action.—The rectified oil of amber is stimulant and antispasmodic, and excites the secretions of the bronchial mucous membrane and kidneys. Locally it is counter-irritant.

Therapy.—The volatile oil of amber has been used as a counter-irritant to the chest in cases of whooping-cough, and to the back, along the spine, for certain spasmodic affections, such as chorea and infantile convulsions. It is a useful ingredient, in liniment, for chronic rheumatism, though probably inferior to oil of turpentine. Internally it has been given for amenorrhœa, digestive disorders, with pain, but is rarely prescribed at present. The oil of amber has likewise been found of avail in spasmodic affections, as hysteria, hiccough, and whooping-cough.

SULPHAMINOL.—Thio-oxy-di-phenyl-amine.

Pharmacology.—When salts of oxydiphenylamine, dissolved in water, are exposed to the action of sulphur, a yellow powder is precipitated, which is without taste, odorless, readily dissolves in alkaline solutions; and in alcohol, with acetic acid, it forms yellow salts. In contact with animal liquids, sulphaminol, like salol, is split up into its components, forming nascent sulphur and phenol.

Physiological Action.—From its nature it is inferred that it is an active intestinal and systemic disinfectant. It is excreted by the urine, being converted again into oxydiphenylamine. Prof. Kobert found that in animals it is comparatively innocuous, even in doses of more than 7½ grains for each pound of body-weight. He also declares it to be without poisonous properties when administered in the human subject.

Therapy.—Sulphaminol has been tested as a disinfectant by Dr. Schmidt, of Frankfort, in laryngological practice, and found to be a good deodorizer, as well as antiseptic. Clinical observations in other fields of practice are wanting. It should be a good intestinal disinfectant in cholera Asiatica and summer cholera; also in typhoid fever, dysentery, diarrhœa, infectious dyspepsia, etc.

SULPHONAL.—Di-ethyl-sulphoni-di-methyl-methane.

Dose, gr. xv–xl.

Pharmacology.—This is a synthetical compound, first manufactured in Germany, by Baumann, and is a quasi-proprietary preparation, as usually sold. It is a whitish, crystalline solid, without odor or taste, soluble in 100 parts of cold water and in 18 or 20 parts of hot water. It is generally administered in hot broth, coffee, or milk. The insolubility and slow rate of absorption of this substance, particularly when given in capsules or suspended in a mucilage, is accountable, in the opinion of Dr. D. D. Stewart, for much disappointment in the use of the drug, which he esteems as the most satisfactory of the newer hypnotics.* He suggests that at bed-time the sulphonal be completely dissolved in boiling water, and drunk as soon as it has been cooled to a

* Journal American Medical Association, February 21, 1891.

temperature which can be borne. At this point not the slightest precipitation occurs. The solution, if desired, may be flavored with some such *liqueur* as *crême de menthe* ("green-mint cordial").

Physiological Action.—Sulphonal is a hypnotic. The committee, of which Dr. T. Lauder Brunton is chairman, appointed by the British Medical Association to determine the relative value of the different hypnotics, especially with regard to the certainty of their action and question of tolerance, reported* that sulphonal was an efficient hypnotic in doses of 10 to 20 grains, given at night, and that it was generally well borne, and its effects were not lost during periods of several months. In a case of chronic gout, 30 grains produced no effect. In 6 out of 10 cases, in which 20 grains had been given, disagreeable after-effects were noted; drowsiness the following day was observed six times, giddiness four times, and headache and inco-ordination of gait, each twice. In 7 cases, with 30 to 60 grains, drowsiness was noted four times, giddiness twice, headache twice, inco-ordination of gait and vomiting, each once. Several cases showed that a second dose on the succeeding night (20 grains) has a greater effect than on the first night. In some cases, prolonged use of the drug seems to diminish its effects. Thus, in 1 case (asthma and bronchitis) 20 grains were given every other night for eight weeks. During the first fortnight, sleep came on in an hour and lasted twelve hours each night. The drug was then omitted for a week, when the insomnia returned. In the succeeding five weeks the drug, after three hours, produced six hours' sleep. In a case of phthisis, 20 grains were given every other night for twenty-six days, except for five days, when the dose was reduced to 5 grains, but afterward was increased. During the time the patient was taking 20 grains, after an hour he slept for six hours. The drug was omitted for a fortnight, and, on recommencing it, only drowsiness and no sleep followed. In a case of neurasthenia with insomnia, quoted by Mr. Priestley, sulphonal, 10 to 20 grains, did not lose its effect during six months.

Smith, of London, finds that while under the influence of the drug the amount of urea and the quantity of urine are each slightly increased, but no evidence of marked destructive action upon nitrogenous tissues exists. In moderate doses, the drug is completely changed during its passage through the body into a sulphuretted organic substance. Dr. Wm. F. Shirk, of Easton, Pa., finds that sulphonal acts especially upon the higher nerve-centres. It produces relaxation of the muscles and a staggering gait. Motor nerves are unaffected. Little if any effect was exerted upon the circulation or the composition of the blood; upon the respiration the drug is depressant. Dr. Crozer Griffith reports a

* British Medical Journal, July 26, 1890; Therapeutic Gazette, October, 1890, p. 623.

number of cases where the after-effects were more or less severe.* As a result of a review of the literature of the subject and 18 cases of his own, he concludes that the chief disadvantages of sulphonal are: 1. Its hypnotic action usually develops very slowly. 2. This action is very liable to be prolonged throughout a greater or lesser part of the following day. 3. It is difficult to determine the dose which may be given with effect and with comfort in each individual case, and this dose may vary at different times in the same case. 4. The drug is liable to produce unpleasant secondary effects, which may even replace the primary hypnotic action; chief among these are mental excitement, nausea, vomiting, dizziness, headache, langour, exhaustion, depression, and a staggering gait; these symptoms may appear after large or after quite small doses. 5. It very often fails to exert any hypnotic action, either in any dose whatever or in any amount which can be given with comfort to the patient. It sometimes produces a scarlet eruption upon the skin, as noted by Engelmann. Dr. Hugh R. Beevor advises caution in the use of sulphonal, and believes that it may exert a deleterious influence upon the composition of the blood.

Dr. Knaggs† reports a fatal result on the third day, in spite of treatment. The patient, after taking an ounce of sulphonal, fell into a stupor; pulse and respiration were slow, temperature a little elevated (100° to 103°), and there was general and complete anæsthesia. Death resulted from failure of the respiration. Dr. T. H. Dillingham‡ reports a case of recovery, after taking 90 grains, in an elderly lady; stupor, with stertorous respiration, pulse slow, muscular inco-ordination, ptosis, slight facial palsy, dysuria, no albuminuria. Patient recovered gradually in about two weeks. Dr. R. R. Pettit reports a case of death from failure of respiration of a woman, after taking 30 grains. She was suffering from melancholia, with hysterical manifestations.

Therapy.—From the preceding summary, the therapeutic applications of sulphonal may be readily inferred. It has been given successfully in nervous insomnia and in insanity. Dr. William H. Flint considers it a safe and reliable hypnotic, but is not an analgesic. It has recently been introduced into the British Pharmacopœia, so that it may be regarded as possessing established value as a somnifacient. A very good review of its therapeutic applications is contained in the "Annual of the Universal Medical Sciences for 1890," by Drs. Griffith and Cattell. Boettrich asserts that 7½ grains of sulphonal are generally successful in the prevention of night-sweats. He thinks that the effects of sulphonal

* Therapeutic Gazette, May, 1890.
† British Medical Journal, October 25, 1890.
‡ Medical Record, December 13, 1890.

equal those of atropine, and finds the former to retain its power, the sweating being decidedly less the night after a dose has been taken.* Jeffries reports (*Weekly Medical Review*) chorea much improved by the conjoined use of sulphonal and arsenic. He regards sulphonal as a valuable adjuvant to arsenic in the treatment of this disease. Casarelli has made use of sulphonal in the treatment of diabetes, upon which he observed this drug to have a favorable influence, gradually lessening the quantity of sugar. The amelioration is evident after the remedy has been used for several days in dose of 15 to 30 grains per diem. In the dose of 45 grains, long continued, it produced a condition of lethargy and sometimes delirium. But if intermitted for a day, or if the dose be diminished, these manifestations cease. If the drug be abandoned the sugar soon re-appears.†

SULPHUR.—Sulphur, Brimstone.

Officinal Forms and Preparations.

Sulphur Sublimatum (U. S. P.).—Sublimed Sulphur, Flowers of Sulphur. *Dose*, gr. xx–ʒj.

Sulphur Lotum (U. S. P.).—Washed Sulphur (sublimed sulphur thoroughly washed with water). *Dose*, ʒss–℥ss.

Sulphur Precipitatum (U. S. P.).—Precipitated Sulphur (sublimed sulphur treated with lime, hydrochloric acid, and boiling water). The preferred form for internal administration. *Dose*, gr. xxx–ʒij.

Sulphuris Iodidum (U. S. P.).—Iodide of Sulphur. *Dose*, gr. ss–j.

Unguentum Sulphuris (U. S. P.).—Sulphur Oiutment (sublimed sulphur 30, benzoinated lard 70 parts).

Unguentum Sulphuris Alkalinum (U. S. P.).—Alkaline Sulphur Ointment (washed sulphur 20, carbonate of potash 10, water 5, benzoinated lard 65 parts).

Pulvis Glycyrrhizæ Compositus (U. S. P.).—Compound Liquorice-Powder (contains washed sulphur 8 per cent.) (See page 646.)

The officinal *sulphites* are of sodium, potassium, and magnesium, and the bisulphite and hyposulphite of sodium. Sodium sulphocarbolate is also officinal.

The recognized *sulphides* are *Calx Sulphurata* (U. S. P.), commonly misnamed sulphide of calcium (consisting chiefly of sulphide of calcium and sulphate of calcium, in varying proportions, but containing not less than 36 per cent. of absolute sulphide of calcium); *Antimonium Sulphuratum* (U. S. P.), chiefly antimonious sulphide, with a very small amount of antimonious oxide; *Antimonii Sulphidum* and *Sulphidum Purificatum* (U. S. P.), see page 443; and *Potassa Sulphurata* (U. S. P.), which should contain at least 56 per cent. of true sulphide of potassium.

Oil of Sulphur is the popular name of a preparation made by boiling olive-oil 8 parts and 1 part of sublimed sulphur together in an iron pot until a uniform mixture is obtained: according to the old Edinburgh Pharmacopœia, it was also known as balsam of sulphur. The oil is partly decomposed, and the resulting preparation has an extremely fetid odor and acrid taste. The German Pharmacopœia has a similar preparation, made with linseed- instead of olive- oil.‡

* Therap. Monatsheften, March, 1890; American Practitioner and News, January 31, 1891.
† Annales de Thérapeutique Medico-Chirurgicales, September, 1890.
‡ Druggists' Circular, January, 1891.

Spirit of Sulphur, or liquor fumans (Boyle), is the name applied to a preparation prepared by adding washed sulphur 1 part to concentrated ammonia 6 to 8 parts, and passing hydrogen sulphide through the mixture until the sulphur is dissolved.*

Ichthyol contains a large proportion of sulphur. (See page 707.)

Pharmacology.—Sulphur is a non-metallic, solid element, found native in Sicily and Iceland in the neighborhood of extinct volcanoes; it is widely distributed in combination with metallic bases as sulphides, especially of iron, copper, lead, mercury, etc. It is of a lemon-yellow color, tasteless, odorless and brittle. At a temperature of 111.5° C., it melts into a brownish-yellow, transparent liquid, which crystallizes on cooling. It is dimorphous, having two distinct forms of crystals. Sulphur is insoluble in water, but very slightly soluble in alcohol, ether, and benzine; its best solvent is bisulphide of carbon. It is likewise soluble in the oil of turpentine and in alkaline fluids. It has powerful chemical affinities, and in combination with oxygen forms sulphurous and sulphuric acids, which, with bases, form sulphites and sulphates. (See pages 390 and 392.) Sulphur is an important constituent in certain native mineral springs, which furnish sulphuretted waters. In this place the action of sulphur need alone be considered. The sublimed sulphur contains a trace of free acid, which makes it slightly irritating, and, when taken into the intestines, it occasionally causes griping. Owing to its insolubility in water, sulphur, either washed or precipitated, has no effect upon the skin, although when kept in contact with it for some time it may be partially oxidized, forming sulphurous acid, which is an energetic disinfectant. In the alimentary canal, the pure sulphur acts as a laxative, partly as a result of chemical change (since hydrogen-sulphide gas is formed in considerable quantity, and sulphur compounds are found in the blood) and partly mechanically as a dry powder.

Physiological Action.—The fact that sulphur enters the blood from the small intestine is shown by its chemical effects upon silver coins or jewelry worn by persons while taking it; secondly, by the physiological effects,—its appearance in many secretions; and, thirdly, its therapeutic results as an alterative. The intestinal secretions are moderately increased by it, as well as the peristaltic movements, and the stools are rendered softer. It is believed to exert a stimulant effect upon the mucous membranes and skin, and strong applications in the form of an ointment bring out an eruption of an eczematous character. Sulphur is excreted principally by the bowels, but also by the skin, the perspiratory and the milk-glands, and by the urine; in the latter it usually appears as a sulphate, in the others it is in the form of sulphuretted hydrogen. Sulphur plays an important part in the normal physiological processes of the body, being a constant constituent of albumin, and present in

* Druggists' Circular, January, 1891.

nearly all the solids and fluids of the body. From this fact and others, we are led to believe that sulphur is essential to the health of albuminous organs and tissues, and is an important element in nutrition. The antiseptic and germicidal effect of sulphur may exercise an important prophylactic influence in preventing, under ordinary circumstances, the invasion of the tissues by micro-organisms. Observations were published a short time ago by Prof. H. C. Wood as to the absorption of sulphuretted hydrogen gas by the intestinal mucous membrane and its passage into the blood to be carried to the lungs, where it escapes from the bronchial mucous membrane and acts as a local disinfectant. This gives a hint of the unsuspected rôle, played by sulphur, of a pulmonary disinfectant and expectorant, in addition to the property, for which it is already valued, of an intestinal disinfectant. It probably, after absorption, favors the bile-producing function of the liver, since taurocholic acid normally contains a large proportion of sulphur. Upon the circulation no direct effect is noticed, but it is believed that it increases the heart's vigor, as it does that of muscular tissue in the arteries and in the various hollow viscera, as well as the voluntary muscles.*

Therapy.—Sulphur is used in a very large number of diseases externally, and often with marked curative action. In acute infectious disorders (diphtheria or scarlatina, for instance), the flowers of sulphur may be insufflated into the throat or nose with marked benefit, limiting the spread of the disease, destroying the micro-organisms, and preventing blood-poisoning. In scarlatina, erysipelas, measles, and small-pox, an ointment containing sulphur moderates the heat of the skin, allays congestion or inflammation, and disinfects the pustules of variola. The use of baths containing sulphide of potassium, or a resort to a sulphur spring, are of great value in syphilis. In very many integumentary inflammations, especially chronic eczema and psoriasis, sulphur alone, or combined with other drugs, will lessen the congestion and overcome the infiltration of the parts. It is often employed with advantage in chronic acne and rosacea, but great care should be exercised in applying it upon the face, especially if the sebaceous glands are in patulous condition. If brought in contact with the skin under the latter circumstances, the glands often become filled with sulphur and occasion many black points (acne punctata) upon the skin. The following formulæ are useful in acne, especially of the face:—

℞ Sulphur. sublimati, ... ʒj.
Glycerini, ... fʒij.
Aquæ rosæ, ... q. s. ad f℥vj.

M. Sig.: Apply with a soft sponge at night, after evacuation of pustules and the local use of hot water.

* See paper by author on "The Physiological and Therapeutical Action of Sulphur," Transactions of the Pennsylvania State Medical Society, 1890.

℞ Sulphuris sublimati,
Pulv. marantæ,
Saloli, ... āā ʒj.
Ungt. zinci oxidi, ... ℥j.
M. Sig.: For acne; apply once or twice daily.

In alopecia, especially the circumscribed variety, sulphur often acts well in assisting to restore the growth of the hair. In very many diseases of the skin, especially those of a parasitic nature, this agent can be used more effectively in the form of a sulphur-vapor bath. Sulphur is very largely employed as an external remedy in scabies, but it is also excellent for pediculosis, tinea capitis, barbæ and corporis, and tinea versicolor. As a germicide, its effects are most evident when combined with oxygen, as sulphurous-acid gas. (See page 592.) In treating scabies, no permanent result should be expected, unless measures are taken to prevent re-infection by the parasite. The under-clothing must be destroyed, or, at least, exposed to an elevated temperature for several hours, and thoroughly washed with soap and boiling water. The patient should take a warm bath, rubbing the interdigital spaces and flexures of affected points thoroughly with potash or soft soap. After the bath the following ointment may be rather freely applied to the affected spots, or where itching is experienced, and allowed to remain until morning, when it may be wiped off:—

℞ Ol. cadini, ... f ʒj.
Ungt. sulphuris, ... ʒij.
Lanolini, ... ʒv.
M. Sig.: Apply at night, as directed.

A repetition of this treatment, once or twice, may effectually relieve the patient of his parasites. When the sulphur ointment is used it sometimes causes an eczematous eruption, which may be avoided by diluting the preparation. In pediculosis of the body a similar treatment to the above is generally effective, providing the clothing be changed at the same time. In either of the preceding cases, the cure is not to be attributed to the direct parasiticide effect of sulphur, but is owing to the fact that it makes a dense and tenacious substance with lard, which suffocates the itch-insect. Indeed, Professor Leidy is of the opinion that the sulphur is unnecessary, as the oil would block up the air-pores of the acarus just as well without it. In sciatica, H. G. de Mussy envelops the limb in a cloth containing a thick paste of the flowers of sulphur. One night is sufficient to relieve the patient. The urine acquires a very strong odor of sulphuretted hydrogen. L. Duchesne also reports success with this in a case of several years' standing.*

* Annual of the Universal Medical Sciences for 1890, vol v, p. A-144.

Internally, sulphur is used as a simple laxative, especially combined with potassium bitartrate, in affections of the lower bowel, irritable piles, stricture, fissure or fistula. By relieving engorgement of the hæmorrhoidal vessels, sulphur proves useful in cases of bleeding from piles. After operations upon the pelvic organs it is the best laxative to administer. The dose ordinarily need not be more than 5 to 10 grains daily in order to insure a free evacuation of the bowels, and if it is continued for some time we obtain valuable systemic effects. In chronic sore throat, associated with, or springing from, indigestion, these small doses of sulphur, with some attention to hygiene, will effect a cure. In digestive difficulties due to disordered action of the liver, which ultimately lead to lithæmia and structural lesions, the habits of life must first be corrected, and the hepatic torpor will then be overcome by small doses of sulphur. Dr. Garrod has reported remarkable relief from obstinate hepatic colic by the daily use of a 5-grain sulphur lozenge, persisted in for months. In hepatic disorder attended by constipation, it may be well to administer a mercurial purge to initiate the treatment, before giving the tonic doses of sulphur. As sulphur stimulates mucous membranes, it is useful in chronic bronchitis, as Graves long ago pointed out in his clinical lectures. For this purpose sulphuretted mineral waters and the springs from which they flow are justly celebrated.

This remedy is especially suitable to the chronic bronchitis, accompanied with copious secretion, of aged and debilitated persons. In whooping-cough, small doses of sulphur lessens the paroxysms; and the following formula, as modified from Sée, may be administered :—

℞ Sulphuris præcip.,	gr. l.
Abstract. belladonnæ,	gr. j.
Pulv. ipecacuanhæ et opii,	gr. v.
Sacchari albi,	gr. xx.

M. et ft. capsulæ vel chartæ x.

Sig.: From two to ten capsules or powders a day, according to the age of patient and effect produced.

Garrod suggests that sulphur may be of service in cystitis, and, perhaps, in some disorders of the kidney. It might very properly be tried in tubercular or gouty pyelitis, and likewise in disordered menstruation, when largely or entirely functional in character. In muscular pains, attending lithæmia, gout, and rheumatism, Garrod employed small doses of sulphur in conjunction with iodine or arsenic, and he has seen great improvement from this treatment, even in rheumatoid arthritis. Sulphur has not, hitherto, given very positive results in tuberculosis, but might be of great service in the incipient stages of pulmonary disease. The continued administration of fractional doses of sulphur is often beneficial in seborrhœa, sycosis, chronic eczema, psoriasis, and other cutaneous

diseases, especially when the upper layer of the skin and the glands are involved. In alopecia, small doses of sulphur will often increase the activity of the hair-forming apparatus, and may also assist in restoring the hair to the parts. In diseases of the nails, especially when they become brittle, covered with ridges and white spots, the continued use of small doses of sulphur will frequently bring about a healthy and polished appearance of these useful appendages.

The sulphide of calcium, in the treatment of acne, has already been referred to (page 499). Spirit of sulphur was formerly believed to be a panacea, or a remedy possessing the quintessence of healing qualities; it was given in syphilis, rheumatism, diabetes, consumption, in doses of 3 or 4 drops, well diluted. It is merely a solution of ammonium sulphide, and might be given in larger doses without doing either much harm or good to the patient.

SUMBUL (U. S. P.).—**Sumbul, Musk-Root.**
Dose, gr. x–ʒj.

Preparations.

Tinctura Sumbul (U. S. P.).—Tincture of Sumbul (10 per cent.). *Dose,* f ʒss–j.
Extractum Sumbul.—Extract of Sumbul. *Dose,* gr. ¼–j.

Pharmacology.—Sumbul is the root of Ferula sumbul (Umbelliferæ), growing in Asia. The drug consists of transverse sections of the root. Sumbul has a decided odor, resembling musk, and a somewhat bitter, balsamic taste. It contains two acids, **angelic** and **valerianic,** two balsamic resins, a volatile oil, bitter extractive, etc.

Physiological Action.—In its effect upon the nervous system, sumbul resembles valerian, and is an efficient nerve-tonic.

Therapy.—Sumbul is probably of some value in hysteria and neurasthenia, in anæmic women. For such cases Goodell prescribes:—

℞ Extracti sumbul alc.,
Ferri sulphatis exsiccat., ... āā gr. xx.
Asafœtidæ, ... gr. x.
Acid. arseniosi, ... gr. ss.
M. et ft. pilulæ no. xx.
Sig.: Take one, thrice daily, after meals.

The tincture may be given in hysteria, chronic bronchitis with spasmodic cough, also in delirium tremens, as a substitute for musk. By Russian practitioners, sumbul is esteemed a valuable stimulant in typhoid fever, atonic dyspepsia, asthenic diarrhœa, and dysentery. Dr. Granville, who introduced this remedy into England, recommended it in epilepsy and dysmenorrhœa. Phillips testifies to its decided efficacy in facial, sciatic, or ovarian neuralgia occurring in women of a quick and lively nervous temperament. He has seen it useful, also, in certain

stages of phthisis, in the restlessness of pregnancy, and the insomnia of chronic alcoholism. It is essential that a fresh specimen, in good condition, should be employed in making the tincture, in order to get any results.

SYMPHYTUM.—Symphytum, Comfrey.

Pharmacology.—The Symphytum officinale (Boraginaceæ), a small herb of Europe and the United States, has a root possessing some medical properties. It contains some **Asparagin,** a large amount of mucilage, and traces of tannin. It is used in decoction.

Physiological Action.—The asparagin has little, if any, physiological effects beyond slight diuretic action; but the mucilage makes it demulcent and slightly astringent. The pulp of the root has been utilized as a means of stiffening bandages applied to fractures.

Therapy.—The fresh root, bruised and cut, is applied to fresh wounds, bruises, cracked nipples, etc. Internally the decoction is given in diarrhœa, dysentery, pulmonary affections, and other relaxed conditions of mucous membranes. It is utilized for the purposes to which marsh-mallow is ordinarily applied, in domestic cough mixtures, etc.

SYZYGIUM JAMBOLANUM. See Jambol, page 713.

TABACUM (U. S. P.).—Tobacco.

Preparations.

Infusum Tabaci.—Infusion of Tobacco (ʒj–Oj). *Dose*, as an enema, fʒij–℥ij.
Vinum Tabaci.—Wine of Tobacco (℥j–Oj). *Dose*, ♏v–xxx.
Oleum Tabaci.—Oil of Tobacco. A virulent poison.
Nicotina.—Nicotine. *Dose*, ♏$\frac{1}{30}$–$\frac{1}{10}$.
Unguentum Tabaci.—Tobacco Ointment (ʒj or more to ℥j).

Pharmacology.—The commercial dried leaves of Nicotiana tabacum (Solanaceæ), indigenous to the southern portions of this country and cultivated in different parts of the world, are known as tobacco. It was carried to Europe by the Spaniards, and from the court at Lisbon it was taken to France, in 1560, by the French ambassador, whose name, Nicot, is preserved in the generic title applied to the plant. Its active principle is a liquid alkaloid, **Nicotine.** The fumes, when burning, contain **pyridine,** hydrocarbons of the aromatic series, small amounts of creasote, hydrocyanic and acetic acids, sulphur and carbon compounds, and certain gases, but little, if any, nicotine, which is decomposed by heat (Zeise). The existence of **Nicotianin,** a camphoraceous substance, has been affirmed by Hermbstädt, but is denied by Fluckiger, who considers it a fatty acid contaminated with a little volatile oil. Slight differences in composition exist in specimens grown in different places, as it is well known that the variation in flavor and quality is very decided.

The best tobacco is grown in Cuba and Virginia. The Turkish variety is almost free from nicotine, and is very mild. In the East, the tobacco is sometimes tinctured with opium, in order to increase the narcotic effect. There are no officinal preparations.

Physiological Action.—Tobacco is an acro-narcotic poison, acting energetically, in small doses, upon persons unaccustomed to its use. It is a nauseating emetic, its action being accompanied by great muscular relaxation; the respiration and circulation are depressed, the temperature lowered, and the surface becomes cold and moistened with perspiration. It is a stimulant to the salivary and intestinal secretions, increases the peristaltic movements of the bowel and the flow of urine and perspiration. The muscles, which at first are relaxed, may be seized later by tremor or clonic spasms, or even tonic contractions, followed by paresis of a transitory character. The nervous system is early affected by the drug. The motor nerves are paralyzed progressively from the periphery to the central organs; there are no marked effects upon the sensory nerves. The spinal and central centres become affected, and incoordination, a staggering gait, and vertigo are prominent symptoms of the toxic action. Finally, collapse and death may occur from paralysis of the heart or of the respiration. Similar results also follow the inhalation of tobacco-smoke, though generally they appear in a much milder form than when the drug is swallowed. Poisoning has also followed the application of tobacco-leaves to a wound, in the case of a child 12 years of age. **Nicotine** is a most active poison, resembling hydrocyanic acid in the rapidity of its fatal effects. It is a powerful antiseptic. The use of tobacco in the form of snuff, or by chewing or smoking, is almost universal, and extends to uncivilized and civilized alike, and is especially prevalent among the robust and those who lead an active life. In fact, tobacco must perform some important part in physiological life, or in the struggle for existence, or it would not be so widely used by men who are distinguished by the soundness of their judgment and their success in solving the problems of social existence in every other detail. The slightly depressing effects of tobacco, the power of increasing the secretions along the alimentary canal, while favoring peristalsis and the function of the kidneys, are valid arguments for moderate indulgence in the post-prandial cigar; but there are also psychic effects which follow its use: it allays restlessness and muscular irritability, and creates a lassitude which is favorable to the pleasant flow of fancy, so happily illustrated in the "Reveries of a Bachelor" of Donald G. Mitchell. The fact that it is a sexual sedative may or may not contribute to its popularity among those who lead sedentary lives, and who find it helpful to them from experience of its effects. rather than from any judgment based upon

an exhaustive knowledge of its physiological action. Occasionally, from smoking an unusually strong cigar, or too many of them, there is nausea and vertigo, even in practiced smokers. In such cases, a stimulant, such as aromatic spirit of ammonia or compound spirit of ether, promptly alleviates the distress.

Poisoning and Antidotes.—In cases of acute poisoning and collapse, strychnine, and ether, or other stimulant may be given hypodermatically, and the patient kept quiet and warm. Mustard-leaves may be applied to the chest and other parts of the body, and artificial respiration practiced, if needed. Stimulating enemata, containing alcohol or turpentine, may be useful; and, if there is much vomiting, brandy and ice may be given in small quantities. Tannic acid and iodides are chemically incompatible, and camphor is a physiological antidote. In what might be called chronic tobacco-poisoning, we have various inflammations of the mouth; epithelial cancer occasionally of the lip or tongue; follicular pharyngitis; bronchial catarrh; rapid, weak, and irregular action of the heart, which may become hypertrophied; dyspepsia, and weakness of sight, due to restriction of the field of vision (scotoma), which may progress to total blindness. Color-blindness has been attributed to the excessive use of strong tobacco. Muscular weakness and tremors and reduced capacity for physical and mental exercise are common symptoms of an abuse of tobacco. Probably, the need of something to restore the nervous system after using tobacco is one explanation of the frequent resort to alcoholic stimulants by users of the weed. The habit of excessive indulgence is especially injurious when the fumes are inhaled, as in cigarette-smoking, as by this means the poisonous products are brought directly into the air-cells, and are absorbed by the blood. In all such cases the treatment must begin by reduction, or complete cessation, of the habit of smoking, and the administration of strychnine sulphate in small doses, with open-air exercise. If there is much overaction of the heart, it can be steadied by small doses of opium, with digitalis or strophanthus.

Therapy.—Tobacco is not used medicinally, its good effects as a cathartic not being of sufficient value to counteract its depressing action upon the heart and respiration, to which some persons are especially liable to suffer. The only practical application is to afford an excuse for the prescription of an Havana after a good dinner, as an aid to digestion. Tobacco may be mixed with stramonium or belladonna, and the smoke inhaled, with relief in asthma. It should not be administered internally for strychnine poisoning, nor in tetanus, nor used per enema.

Previous to the introduction of chloroform and ether, tobacco was much employed in order to produce muscular relaxation in strangulated hernia, after fracture of the femur, etc. Every purpose for which to-

bacco was formerly used is now accomplished more efficiently and safely by the anæsthetics.

TAMARINDUS (U. S. P.).—**Tamarinds.**

Pharmacology and Therapy.—The preserved pulp of the fruit of Tamarindus Indica (Leguminosæ) is only used in medicine for the purpose of making a refrigerant and somewhat laxative infusion, and also as an ingredient in the confection of senna. A tamarind whey, which may be used as a refrigerant in fevers, is made by infusing an ounce of the pulp in a little boiling water, and adding this to a quart of milk.

TANACETUM (U. S. P.).—**Tansy.**

Pharmacology.—The leaves and tops of Tanacetum vulgare (Compositæ), or common tansy, contain a bitter principle, **Tanacetin,** a volatile oil, tannic acid, etc. The dose of the volatile oil is ♏i–iij; a fluid extract and an infusion (ʒj–Oj) are also used.

Physiological Action.—Tansy is an aromatic, bitter tonic, and, by virtue of its volatile oil, it is diuretic and emmenagogue. Large doses, half an ounce or more of the oil, taken to procure abortion, cause disturbance of the respiration, depression of heart's action, clonic spasms, stupor, and death; sometimes it causes abortion, but only because of its violent irritant action upon the gastro-intestinal tract, which may lead to inflammation.

Poisoning.—The treatment of an overdose is the free use of demulcents and purgatives to clean out the stomach and bowels, followed by opium and bismuth and diffusible stimulants.

Therapy.—Tansy is a useful ingredient in functional dysmenorrhœa, amenorrhœa, and ovaralgia, in doses of ♏ss–j, in pill, or dropped on sugar. In suppressed menstruation from cold, it may be given in conjunction with hot drinks and hot applications. It has some anthelmintic effects, but should not be used for this purpose.

TARAXACUM (U. S. P.).—**Dandelion.**

Preparations.

Extractum Taraxaci (U. S. P.).—Extract of Taraxacum. *Dose*, gr. x–xl.
Ext. Taraxaci Fluidum (U. S. P.).—Fluid Extract of Taraxacum. *Dose*, fʒi–ij.
Infusum Taraxaci.—Infusion of Taraxacum (℥ij–Oj). *Dose*, f℥i–ij.

Pharmacology.—The root of Taraxacum dens-leonis (Compositæ), or dandelion, should be gathered in the autumn. It is a well-known common perennial of America and Europe, bearing a yellow head of flowers on a slender peduncle, from a cluster of radial leaves. All parts of the plant contain a milky, acrid juice, which exudes when the plant is cut or bruised. It contains **asparagin** (found also in asparagus, marsh-mallow, liquorice-root, wahoo or euonymus, the potato-plant, and

the root of the locust-tree—Robinia pseudacacia), which has little, if any, therapeutical value. The active principles are **Taraxacin** and **Taraxacerin**; the former is dissolved out by hot water, the latter by alcohol, from the insoluble residue. The root also contains inuline, mannite, and resin.

Physiological Action.—Dandelion preparations are bitter, and probably stimulate the digestive secretions and act as a tonic. It is a feeble, hepatic stimulant, according to Rutherford. It is somewhat laxative, and also diuretic.

Therapy.—In deficient secretion of gastric juice or of the bile in atonic dyspepsia and torpid liver, taraxacum acts as a mild stomachic and is of service in duodenal dyspepsia. Dandelion is also prescribed in catarrhal jaundice. It has no specific action in liver disorders, but is often combined with other remedies which have such effect:—

℞ Potassii iodidi, ... ʒj.
Ext. taraxaci fl.,
Syr. glycyrrhizæ, ... āā f℥ij.

M. Sig.: A tablespoonful four times daily, for incipient cirrhosis of the liver.

The fluid extract of taraxacum is an acceptable vehicle for nitro-hydrochloric acid or the chloride of ammonium.

TEREBINTHINA (U. S. P.).—Turpentine.

Preparations.

Oleum Terebinthinæ (U. S. P.).—Oil of Turpentine. *Dose*, ♏v–xv, or as an anthelmintic, f℥ss.

Linimentum Terebinthinæ (U. S. P.).—Turpentine Liniment (resin cerate, 65 parts; oil of turpentine, 35 parts).

Linimentum Cantharidis (U. S. P.).—Cantharides Liniment (cantharides, 15 parts; oil of turpentine, 85 parts). A strong counter-irritant.

Pharmacology.—Turpentine is a concrete oleoresin, obtained from Pinus Australis, and from other species of Pinus (Coniferæ). It consists of a volatile oil, which is known as oil of turpentine, or, incorrectly, spirit of turpentine, and resin. (See page 854.) The oil is distilled from any variety of Pinus capable of furnishing it, and, at first, is a thin, limpid liquid, but afterward gradually absorbs oxygen from the air and forms resin, which makes it thicker. Old oil of turpentine is an ozonizing agent, and is recommended in cases of phosphorus poisoning. Chian turpentine (Pistacia terebinthus), coming from Chio and Cyprus, does not materially differ from the ordinary form, except that it has a more agreeable odor, resembling that of lemon or fennel; and as it does not come from any species of Pinus, but is produced by a larch-tree (belonging to the Anacardiaceæ), it is not an officinal variety. It is given in doses of gr. iii–v, in an emulsion. White turpentine (Thus Americanum, Ph. B.)

is identical with the whitish, granular, under layer, or solid matter, deposited by turpentine upon standing; it is the spontaneous exudation upon the tree, which is scraped off and sent to market in yellowish-white masses, known under this name. The various forms of turpentine are soluble in alcohol, forming what is commonly called varnish. Turpentine is very inflammable, and burns with a heavy cloud of black smoke of unconsumed carbon. The oil is inflammable and explosive. The oil of turpentine possesses a peculiar, characteristic odor and taste, has a specific gravity of 0.86, is soluble in alcohol, ether, chloroform, glacial acetic acid, benzol, and insoluble in water. It is a solvent for wax, iodine, sulphur, phosphorus, and fixed oils. Rectified oil of turpentine is oil which has been re-distilled; it is the only form suitable for internal administration.

Canada Turpentine, or balsam of fir, is officinal (see Terebinthina Canadensis). It is a liquid oleoresin, obtained from Abies balsamea, used principally in the arts and in mounting microscopic objects.

Physiological Action.—The oil of turpentine has valuable antiseptic qualities. When applied to the skin it produces redness, tingling, and irritation, and may cause inflammation and blistering. In some cases it even gives rise to ulceration. Some persons are very susceptible to its effects, and the local application will cause marked systemic disorder, with an erythematous rash. Desquamation may follow. In small doses (♏ix–xx), oil of turpentine is a stimulant; in large amounts, an irritant. Doses of f℥i–ij cause burning in the mouth and stomach, with thirst; larger quantities give rise to vomiting and purging, with tenesmus; these effects, however, may be avoided by combination with other agents, and especially demulcents. Upon the circulation, the effects are those of a cardiac stimulant, the pulse is increased in force and in frequency, but toxic doses occasion collapse, with feeble pulse. According to Kobert, medicinal doses increase the blood-pressure by "powerfully stimulating the inhibitory reflex centre, and also the vasomotor centre," but very large doses paralyze both centres, the blood becoming dark and the heart paralyzed. Injection of oil of turpentine into the vessels causes lowering of blood-pressure, with increase of pulse-rate. In small doses it produces vascular contraction. From the very diffusible nature of this substance, it readily finds its way into the circulation, and is carried to the nerve-centres. After poisoning by it, the brain has the characteristic odor of turpentine; it has, therefore, been inferred by Bartholow that it exerts a direct influence upon the nerve-cells. It is through the nervous system that its effects are mainly manifested. After moderate or continued doses, slight exhilaration, like that following alcohol, is observed, followed by an hypnotic effect; toxic amounts cause

delirium, with depressed intellection or stupor, impaired physical power, defective co-ordination (followed by paralysis), coma, with dilated pupils, and death. Such amounts have caused complete muscular relaxation, profound insensibility, and abolition of all reflex movements. Six ounces have occasioned death in an adult, preceded by opisthotonos; "the brain, heart, lung, and viscera were found gorged with blood."

Turpentine is eliminated by the skin and bowels, but principally by the bronchial mucous membrane and kidneys. Its odor is perceptible in the breath. It communicates to the urine a smell similar to that of violets, though, when the dose has been large, the urine possesses a terebinthinate odor. Heat and dryness of the skin, pruritus, and a red rash sometimes result from the internal use of turpentine.

Treatment of Poisoning.—Where persons have been made sick by the vapor of turpentine, as by sleeping in a newly-painted room, it is necessary to give them a supply of pure, fresh air, with cardiac stimulants and diuretics, encouraging the action of the kidneys and skin by hot drinks and pilocarpine. If large amounts have been swallowed, demulcents with opiates are required.

Therapy.—Oil of turpentine is a valuable counter-irritant in peritonitis, pneumonia, bronchitis, asthma, and painful disorders, such as lumbago, pleurodynia, myalgia, etc. A turpentine stupe consists of a piece of flannel heated by steam or by being wrung out of hot water, with a few drops of turpentine sprinkled upon its surface just before application. Spongiopiline may be similarly used. A mixture of equal parts of turpentine and yelk of egg is also serviceably applied to the skin for the same purpose. A turpentine stupe should be removed as soon as it causes pain. In rheumatic joints, a liniment containing turpentine is useful, but the officinal liniment requires dilution:—

℞ Liniment. terebinthinæ,
Tr. opii, ... āā f℥j.
Lin. saponis, ... f℥iij.
M. Sig.: For external use in rheumatism, to be used with friction.

In peritonitis turpentine can be applied over the abdomen, either alone or combined thus, with much benefit:—

℞ Olei terebinthinæ,
Olei olivæ, ... āā f℥ij.
Mass. hydrargyri, ... ℥ij.
M. Sig.: Apply warm with flannel over the abdomen, in peritonitis.

Preparations containing turpentine are advantageous external applications in inflammatory affections of the larynx, pharynx, and tonsils. In diphtheria it has been beneficially employed as a topical remedy, being applied by means of a brush, or administered in the form of a spray

or by inhalation of the vapor. This substance has been used with success in the treatment of severe burns, accompanied by constitutional depression. The injured area is first washed with turpentine, after which a mixture of resin ointment and turpentine is applied. Turpentine is likewise efficacious in the treatment of chilblains. An ointment of turpentine is officinal in the British Pharmacopœia, and is used with advantage in chronic eczema, psoriasis, and alopecia circumscripta. It may also be applied with good effect to unhealthy or indolent ulcers. Internally, the oil of turpentine is antiseptic and astringent in some forms of diarrhœa, especially of a catarrhal character.

It is valuable in acute dysentery after the violence of the attack has somewhat subsided. Turpentine is likewise useful in epidemic dysentery. A few drops of this oil form an excellent remedy in flatulence. In typhoid fever, small doses, given in conjunction with the mineral-acid treatment, are a valuable adjunct, especially when the tongue is red, dry, and clean, and there is abdominal distension. It is best given in emulsion :—

℞ Ol. terebinthinæ, ...	f℥ss.
Pulv. acaciæ, ...	ʒiv.
Aquæ cinnamomi, ...	f℥viij.

M. secundem artem.

Sig.: One tablespoonful every two or three hours in typhoid fever, or the whole amount may be taken at once to remove a tape-worm.

This remedy is, furthermore, valuable in typhoid fever by relieving tympanites and restraining hæmorrhage. If diarrhœa persist or recur during convalescence from this disease, recourse should be had to turpentine. In various forms of hæmorrhage, turpentine is valuable, as in hæmaturia, purpura hæmorrhagica, and in gastric ulcer. It has been found efficient in post-partum hæmorrhage, and is peculiarly valuable in this condition on account of the rapidity of its action. Turpentine also checks the bleeding of scurvy. It is especially in passive hæmorrhage that this remedy is of service. In hæmaturia it has likewise been given with success, but it must be employed only in small doses, and its effects very carefully watched. The unpalatable taste of this liquid is not infrequently a bar to its administration. When the dose consists of but a few drops they may conveniently be given in capsules. Glycerin, with the addition of a drop or two of oil of gaultheria, is said to disguise the taste of turpentine. The following has been recommended as a mixture of not unpleasant taste :—

℞ Ol. terebinthinæ, ...	fʒij.
Ætheris, ...	fʒiss.
Syrup. aurantii, ...	f℥iss.
Aquæ, ... q. s. ad	f℥vj.

M. Sig.: Dose, a teaspoonful.

In chronic cystitis, pyelitis, and gleet, and in bronchorrhœa, small doses of oil of turpentine check the discharge and act as an antiseptic. Incontinence of urine, spermatorrhœa, and prostatorrhœa dependent upon relaxation are not infrequently relieved by turpentine. In low fevers the addition of a drachm of this oil to a hot punch often rouses the patient from a condition of stupor, and acts as a stimulant to the circulation. As a cardiac stimulant, turpentine is of service in puerperal fever, phlegmonous erysipelas, and yellow fever, in capillary bronchitis, pneumonia, and emphysema. In gangrene of the lung it diminishes fœtor.

A mixture of turpentine and ether (equal parts) is supposed to have some influence in removing gall-stones, but it is not probable that it has the effect of dissolving them, as was claimed by Durande; the effects are those of a carminative and antispasmodic. It is useful in this combination (1 part to 3 of ether) in colic as an anodyne. Dr. Hughlings Jackson used oil of turpentine in chorea. The vapor of steam, impregnated with turpentine, is employed for inhalation in laryngeal and bronchial disorders. In erysipelas it may be painted on the surface and taken internally. It is a good local application in ringworm, and has been also employed successfully in some cases of psoriasis by Dr. Crocker in the form of an embrocation with olive-oil (1 to 4), gradually increasing the strength until the pure turpentine-oil is used. The same writer has derived good results in psoriasis and chronic eczema from the internal administration of oil of turpentine in doses of 10 to 40 minims in emulsion after each meal. King Chambers has found that an enema containing half an ounce of the oil, or more, is of great value in sciatica; in which affection this remedy is sometimes beneficially given internally in ½-ounce doses, repeated for several successive nights. In other forms of neuralgia it has proved of service. It seems to be of particular value in debilitated or aged subjects, in whom degeneration of nerve-tissue has occurred. In such cases 2-drachm doses have been found more efficient than smaller quantities. Phillips thinks turpentine particularly indicated when neuralgia is of rheumatic origin. This oil is of undoubted efficacy in chronic rheumatism, relieving the pain and checking the progress of the disease. Amendment takes place under the influence of turpentine in rheumatic sclerotitis, iritis, and choroiditis. Nervous headache is sometimes relieved by this agent; 20 drops of turpentine thrice daily is strongly recommended in lumbago by Dr. George Bird. According to Begbie, turpentine is of service in hydatid cysts, especially of the lung. Phillips has found this remedy, in doses of 1 or 2 minims, night and morning (not fasting), to be of service in certain chronic cases of albuminuria unattended by pronounced symptoms of Bright's disease, reducing the amount of albumin and improving the general condition.

As a general rule, the addition of a drachm or two of oil of turpentine to an enema makes it more stimulating, and therefore this treatment can be adopted in narcotic poisoning. An enema containing turpentine relieves flatulence and constipation, and, as a derivative, is of value in sun-stroke and cerebro-spinal meningitis. As an anthelmintic, it may be combined with castor-oil and is very effective against round worms as well as tænia.

Caution.—Being a stimulating diuretic, the oil of turpentine should be used with caution, as it is apt to produce frequent and painful micturition, with bloody urine, strangury, and inflammation of the kidneys. These symptoms may result from constant inhalation of its vapor. Hæmaturia is not uncommon among sailors engaged on vessels carrying turpentine. Priapism, menorrhagia, and dysmenorrhœa are sometimes occasioned by turpentine. The free use of barley-water and other demulcents, the hot bath, and free purgation will generally quickly relieve the symptoms unless nephritis should occur. Turpentine should not be employed when cardiac hypertrophy or atheroma of vessels exists.

Chian turpentine has been recommended for the cure of scirrhus and other malignant disease of the uterus by Mr. Clay, of Manchester. In spite of his favorable experience, similar good results have not followed its administration in the hands of other observers. The pain of cancer is, however, not infrequently assuaged by Chian turpentine. Its administration in doses of 5 to 15 grains has likewise been followed by improvement in pityriasis rubra.

Terebene is obtained by subjecting oil of turpentine to the action of sulphuric acid and distilling at a temperature of 160° F. It is a clear, mobile liquid, having a peculiar, fresh-pine odor and pungent taste; freely soluble in alcohol, chloroform, and ether, but sparingly soluble in water. In doses of ♏v–xx, it is given with benefit in winter cough, with muco-purulent expectoration, by Dr. Murrell. He finds it useful as an antiseptic in flatulent dyspepsia; also in cystitis and gleet. In diseases of the genito-urinary tract, it can be prescribed as follows:—

℞ Terebenæ, ...	♏c.
Tinct. belladonnæ, ...	♏lx.
Salolis, ...	gr. c.

M. et ft. capsulæ no. xx.
Sig.: From four to six capsules a day, in gleet, stricture, and irritation of the bladder.

In bronchitis and bronchorrhœa, in emphysema, in catarrhal affections of the upper air-passages, even in phthisis, it has been found highly valuable for inhalation. It has no specific action when administered in phthisis, but probably exerts some local astringent and antiseptic effect upon the bronchial mucous membrane, by which it is chiefly excreted.

Terebene has been used with benefit in puerperal fever. In genito-urinary disease it has been given as a substitute for oil of sandal-wood. It should be administered in capsules in the dose of 5 or 10 minims, repeated every three hours. In some cases it irritates the stomach, and might then be made into an emulsion.

A 5-per-cent. aqueous solution of terebene has been locally used as a disinfectant wash in surgical cases.

Terebinthine, a hydrocarbon of similar composition, is obtained by distilling oil of turpentine with an alkali. By hydration, it is converted into terebinthine hydrate, commonly called **terpene hydrate,** a crystalline, solid body, soluble in glycerin. Acids convert it into terpinol, another liquid body similar to terebene, but given in smaller doses (♏ii–v). It is used to fulfill very much the same indications as the preceding.

Terpene hydrate was used by Manasse in 41 cases of whooping-cough. No ill-effects upon kidneys or bowels were observed in children from doses of 20 grains. In doses of 15 to 45 grains, according to age, the severity of the convulsive attacks was notably moderated.

Dr. Talamon makes use of the following combination:—

℞ Terpen. hydrat.,	gr. xv.
Antipyrin.,	gr. xv.
Syr. aurant. cort.,	f℥ij.
Mucilag. acaciæ,	f℥ij.

M. Sig.: One or two ounces several times a day for a child under 4 years of age.

As a local application for diphtheria, Dr. Hutinel uses, in the Hôpital des Enfants:—

℞ Terpen. hydrat.,	ʒij.
Hydrarg. chlorid. corros.,	gr. ivss.
Essent. menthæ pip.,	f℥iij.
Sp. vini rectificat.,	f℥iij.
Essent. thymi,	♏vj.—M.

Dr. Hugo J. Loebinger, of New York, uses terpene hydrate with advantage in hay asthma, giving it in 15- to 20-grain doses. The hydrate of terpene, being a solid, is given in capsules, in bronchial affections, coughs, catarrhs, colds, etc., in doses of gr. ii–x. It should not be confounded with a body of similar name, terpene, found in eucalyptus.

TETRONAL.

Dose, gr. v–ʒj.

Pharmacology and Physiological Action.—Tetronal and trional are allied to sulphonal, having the same general formula, except that whereas sulphonal contains only two ethyl groups, trional and tetronal contain three and four, respectively.

Trional occurs as brilliant tablets, tetronal as brilliant tablets and scales. Both substances have a bitter taste, that of tetronal being at the same time camphoraceous. Trional is readily soluble in alcohol and ether, sparingly soluble in water. Tetronal dissolves in alcohol and ether, but is less soluble in water than trional.

Baumann and Kast have published the results of a number of physiological experiments with compounds allied to sulphonal, from which they drew the conclusion that the hypnotic action of this class is a function of the ethyl groups in the compound, and proportionate in intensity to their number, and that the SO_2 group exercises no influence in this direction. These results were so suggestive that Barth and Rumpel repeated the experiments clinically and on the human subject. The results obtained corresponded to the observations made upon dogs only so far as to demonstrate that tetronal and trional actually possessed hypnotic properties, but they did not confirm the theory, since practically the same doses were required in order to produce the same effects as those of sulphonal, instead of one-half to two-thirds, as might have been expected. These agents might be useful in cases where sulphonal cannot be taken. No injurious effects were observed in any of the 220 cases in which trional and tetronal were administered.*

Therapy.—In delirium tremens, tetronal is less efficient than sulphonal; but as a hypnotic tetronal was found, in 14 cases out of 30, superior to the latter drug, in 6 cases equal, and in only 4 inferior. Trional in 17 cases was superior, in 6 cases equal, and in 7 inferior. Barth and Rumpel conclude that the indications for the use of these compounds correspond with those of sulphonal, and in certain nervous conditions which are refractory to this drug the others may prove more effective, or, at least, are useful substitutes.

Dr. Ernest Schulze, of the Insane Asylum at Bonn, has detailed† the results of his experience with these bodies. He found that trional succeeded in some cases where sulphonal had failed; that both trional and tetronal could be given without any by-effects, in some cases in which sulphonal had given rise to headache, œdema of the eyelids, or hallucinations; and that trional and tetronal were more rapid in their action than sulphonal.

Tetronal sometimes gave rise to loss of appetite and vomiting, but no injurious consequences to heart, lungs, or kidneys had been seen to follow the use of trional or tetronal. Trional in most cases seemed to be preferable to tetronal.

* Pharmaceutical Journal and Transactions, August 30, 1890, and Therapeutic Gazette, October 15, 1890, p. 700.

† Therapeutische Monatshefte, October, 1891.

TEUCRIUM.—Water-Germander, Woodsage.

Dose, gr. xx–xxx.

Pharmacology.—The leaves and flowering tops of Teucrium scordeum (Labiatæ), growing abundantly in Central Europe and naturalized in some of the States along our Atlantic coast, possess medicinal properties. The taste is bitter and decidedly astringent. The virtues of the plant depend upon an oleoresin. Teucrium also contains an essential oil, which is warm and somewhat pungent to the taste. It may be given in the form of an infusion, the dose of which is 1 or 2 fluidounces, or of a fluid extract. The dose of the latter preparation is 1 or 2 fluidrachms.

Physiological Action and Therapy.—Teucrium possesses astringent and stimulant properties. Dr. John W. Eckfeldt reports that it is a useful antispasmodic in certain nervous disorders, as whooping-cough and hysteria of uterine origin. A syrup of teucrium is a good expectorant, restraining excessive secretion, and of especial service in the treatment of nervous coughs. The same observer has found this remedy of service in amenorrhœa and subacute rheumatism. He states that it has been used as an alterative in scrofulosis. Teucrium is particularly valuable in enlargement of the prostate and in hæmorrhoids. In the latter affection it may be used with good effect in the form of a suppository, and alleviates the itching which so often accompanies the condition.

THALLIN.—Parachinanisols.

Dose, gr. i–viij.

Pharmacology.—Thallin, a product prepared by synthesis, exhibits the form of colorless, rhombic crystals, soluble in water, alcohol, and ether. It forms salts with tartaric, tannic, hydrochloric, and sulphuric acids. The sulphate, which has been most generally employed, is a whitish, crystalline powder, of an aromatic smell and taste. Thallin sulphate is readily soluble in water, but sparingly so in alcohol.

Physiological Action.—Thallin possesses powerful antiseptic virtues, and a 4- to 5-per-cent. solution is capable of destroying micro-organisms. Large doses depress cardiac energy and reduce blood-pressure. It rapidly lowers febrile temperature by increasing the dissipation of heat, and the effect may continue for several hours,—though, as a rule, it is of rather brief duration. The reduction is often accompanied by profuse sweating and extreme prostration. Vomiting and diarrhœa, chills, cutaneous rashes, cyanosis, or albuminuria may follow its administration. Thallin is speedily eliminated by the kidneys.

Therapy.—Thallin has been used with advantage as an injection in gonorrhœa, the strength of the solution being from 2 to 2½ per cent. In gleet a weaker solution has given a favorable result. When administered

for the purpose of reducing fever, it has been employed in hourly doses of ½ to 1 grain. In tuberculosis it reduces temperature very rapidly, but, even in small amounts, is apt to occasion alarming prostration. Some have praised its action in typhoid fever, but it has no influence over the duration of the disease; its effect upon the temperature is transient, and it is, upon the whole, less effective and less safe than other remedies of the same class. Professor Demme recommends thallin in the treatment of typhoid fever of children.

THEINA.—Theine.

An alkaloid obtained from Camellia thea, probably identical with caffeine. (See pages 491 and 502.)

THEOBROMA.—Cacao, Chocolate.

Preparation.

Oleum Theobromæ (U. S. P.).—Cacao-Butter.

Pharmacology.—The seeds of the Theobroma cacao (Sterculiaceæ) are oval, and consist of shells and kernels, both of which contain an alkaloidal principle called **Theobromine** (about 2 per cent.), analogous to caffeine (the former being dimethyl-xanthine, the latter trymethyl-xanthine), and a yellowish-white, solid oil, or fat, known as **Cacao-Butter.** This has a faint, characteristic, pleasant odor, is almost tasteless, and has a neutral reaction, melting at the temperature of the surface of the body. It is nutritious, but in medicine is chiefly valuable as a basis for suppositories, and for external application in massage. Chocolate is an article of food prepared from the roasted kernels, which are ground into a fine paste with sugar and flavored with vanilla. When this is added to boiling milk in proper proportion, a pleasant restorative article of diet is made, but rather oily, on account of the presence of the cacao-butter. When the cacao-butter is partly removed by pressure and the kernels roasted and ground, as before, it is known as cocoa,—an unfortunate name, since it causes confusion by resembling cocoa, or the cocoanut-tree, and coca, or the erythroxylon coca, the latter also being the source of an exhilarating beverage used in South America. Cacao-butter is chiefly stearin; it does not become rancid. It has recently been ingeniously substituted in a milk food for infants (Lacto-Preparata of Reed and Carnrick) in order to overcome the objection of the deficiency of fat, since in all these preparations most of the cream has to be removed, because it readily becomes rancid and cannot be kept without developing fatty acids. Cacao-butter is largely used in making suppositories, of which the following may be taken as an illustration:—

℞ Ext. krameriæ, ... gr. v.
Ext. opii, ... gr. ss–j.
Ol. theobromæ, ... gr. xv.

M. et ft. suppositorium no. j; mitte tales no. vj.
Sig.: Insert one at night for irritable hæmorrhoids.

In preparing suppositories the addition of spermaceti causes the mass to congeal more rapidly and renders it less apt to adhere to the molds. There are no officinal suppositories in the United States Pharmacopœia.

Physiological Action.—The physiological effects of theobromine are analogous to those of caffeine, but it does not stimulate the central nervous system to anything like the same extent, and is poisonous only in doses five or six times as great as the latter drug. The effects upon the vasomotor centre in the medulla are also much less. Schrœder * demonstrated that caffeine acted as a diuretic by direct stimulation of the renal epithelium, and subsequently has shown that theobromine acts in the same way. † He also showed that theobromine was less poisonous, and that it was a more powerful and lasting diuretic. Gram ‡ confirmed these observations, but found theobromine insoluble and likely to cause nausea. He, therefore, recommends a double salicylate of theobromine and sodium, containing 50 per cent. of theobromine, as a substitute, which, from its effects, has been called **Diuretin.** This salt has a bitter taste; is a white powder, soluble in half its weight of hot water, and not depositing in cooling. It is best given in solution with an aromatic water; in syrups it is liable to deposit, and in powders it is apt to decompose in a short time. He gave it in 15-grain doses, five or six times daily. The action of diuretin upon the heart very closely resembles that of digitalis.

Therapy.—Diuretin has been tried in various diseases by Hoffmann, § who gave about 75 grains daily; he found it useful in pleuritic effusion. In acute nephritis the amount of urine was tripled. In disorders of the circulation attending lesions of the heart, Hoffmann reports in all great diuresis, decrease in œdema, and strengthening of the pulse. The diuretic action is usually manifested within the first twenty-four hours, and gradually reaches its maximum between the second and the sixth day. It falls rapidly upon discontinuing the drug, or after the disappearance of the dropsy. The amount of albumin in the urine was not much affected, except that in the heart-cases there was distinct lessening. No cumulative effects were observed, and the theobromine was rapidly excreted in the urine. Dyspnœa, bronchitis, anorexia, and general condition were all

* Archiv für Experiment. Pathologie, xxii, 1886.
† *Ibidem*, xxiv, 1887.
‡ Therap. Monatshefte, January, 1890.
§ Archiv für Exp. Pathologie, xxviii, Heft 1, 1890.

improved. Sometimes slight diarrhœa was noticed, but the drug was well borne by the stomach. Excitement and sleeplessness did not occur, but as the circulation improved the patient slept better. In some cases, where digitalis and strophanthus had failed to give relief, theobromine acted well, but, as a rule, it is not so generally useful. It may be combined with them in certain cases so as to assist in promoting diuresis. In Hoffmann's opinion it is much superior to caffeine. It has the advantage, over calomel and other mercurials, of acting upon the heart as well as the kidneys.*

Dr. Demme regards diuretin as useful in the treatment of children. It causes a rapid disappearance of dropsy due to scarlatinous nephritis and of anasarca dependent upon cardiac lesion. He finds it generally well tolerated, and that it can be given in the daily doses of 7½ to 22 grains to children from two to five years old and in proportionally larger amounts to older children. It is inappropriate, however, to infants less than a year old, on account of the gastro-intestinal irritation which it excites. In one case he witnessed a morbiliform eruption, with abundant diarrhœa, after ingestion of 90 grains within four days.

Cacao-butter is a good emollient and protective to apply to excoriated nipples of nursing women and to the thighs of children suffering with intertrigo.

THIOL.

Pharmacology and Physiological Action.—A chemical composed of hydrocarbons and about 12 per cent. of sulphur. It occurs as a soft, gray powder, or scales, as prepared by Riedel, who also furnishes it in liquid form. It resembles ichthyol in chemical composition, and it may produce the same physiological and therapeutical effects. It is said to be non-toxic.

Therapy.—Thiol is employed for the same purposes as an antiseptic and local stimulant as ichthyol, over which it has the advantage of being more agreeable in odor.† Professor Schwemmer reports cases of herpes zoster and dermatitis herpetiformis successfully treated with a 10-per-cent. solution of thiol, used twice daily. He recommends it in other erythematous disorders. In the daily dose of about ⅛ grain, thiol has been successfully given internally for the relief of constipation.

Gottschalk employs thiol in cases of pelvic exudation, acute and chronic endometritis, a 10- to 20-per-cent. glycerin solution being used upon vaginal tampons and the abdomen rubbed once a day with a thiol ointment. To the canal of the womb he applies the remedy upon an

* Supplement to the British Medical Journal, January 3, 1891.
† Wiener klinische Wochenschrift, No. 18, 1890.

applicator. Thiol ointment is irritant to the skin, and its use must be from time to time discontinued.

Another compound in which sulphur is present is known as **Thiophen.** This substance is a hydrocarbon belonging to the aromatic series; is a colorless volatile oil, insoluble in water, and possessed of a slight odor. Two combinations of thiophen have been made the subject of clinical experiment. Sulphate-of-sodium thiophen is a white, crystalline powder containing 33 per cent. of sulphur, half of which is combined with carbon. Its somewhat disagreeable odor is completely lost when it is made into a 5- to 10-per-cent. ointment. The ointment has no irritant effect upon the skin, and has been found beneficial in prurigo.

Thiophen di-iodide has been used as a substitute for iodoform. It is made by replacing two atoms of iodine for two atoms of hydrogen in thiophen. Thiophen di-iodide contains 75.5 per cent. of iodine and 9.5 per cent. of sulphur, both being in combination with carbon. The substance is crystalline, insoluble in water; soluble in alcohol, ether, and chloroform. It inhibits the development of the microbes of suppuration, and has been employed with success in the treatment of wounds and burns.

Thio-Resorcinum.—Thio-resorcin is a sulphur substitution compound of resorcin. It is in amber-yellow crystals, and is used instead of iodoform in minor surgery. It probably might also be used internally, in the same doses as resorcin.

THUJA (U. S. P.).—**Thuja, Arbor Vitæ.**

Dose, f℥ss–j, in fluid extract or tincture (20 per cent.).

Pharmacology.—The fresh tops of Thuja occidentalis (Coniferæ), or white cedar,* growing in the Northern United States, contain **Pinipicrin,** a bitter principle; **Thujin,** a yellow coloring principle. **Thujetin** is derived from the preceding. Its most important constituent is a **volatile oil,** which resembles savin in its physiological effects.

Therapy.—Externally, the recent leaves have been used, rubbed up with ointment, as a stimulating antiseptic dressing for ulcers and condylomata. A strong tincture may be applied externally, in warts and excrescences, and given internally in 5-minim doses. In papillomata of various kinds, Dr. Piffard speaks highly of it, and considers it useful in gleet dependent upon granular urethritis. The oil has been given with the view of expelling worms, but should be cautiously used, as it is a gastro-intestinal irritant. It has even brought on abortion in pregnant women, but only does so by the violent disturbance it creates in the gastro-intestinal tract. In bronchitis, the vapor of thuja, steeped in

* The Cupressus thyoides, an entirely different tree, is also known by the name of white cedar, and more appropriately.

boiling water, often increases expectoration, and has a secondary astringent effect.

Thuja has been used both internally and externally, with some success, in chronic rheumatism. In amenorrhœa and prostatitis it has been found of avail, and is said to have been serviceable in intermittent fever. This remedy seems to exert a certain influence upon the growth of malignant tumors, and has been thought to have a special power in restraining the hæmorrhage which they occasion. It has also been employed in hæmoptysis.

The **Oil of Pumilio Pine,** from an allied species, has been used in drachm doses, given in milk, as a tæniacide. It is pleasant, effective, and apparently a safe remedy.

THYMUM.—Thyme.

Preparations.

Oleum Thymi (U. S. P.).—Oil of Thyme (principally used externally). *Dose,* ♏i–ij.
Thymol (U. S. P.).—Thymol. *Dose,* gr. ss–ij.

Pharmacology.—The Thymus vulgaris (Labiateæ), or thyme, is indigenous to Europe, but cultivated in gardens as an herb. The **volatile oil** is officinal; it has a strong odor, a characteristic pungent taste, a neutral reaction. It consists of two portions, the lighter and more volatile being the hydrocarbons **Cymene** and **Thymene,** the second being chiefly **Thymol,** which is officinal. It should be quite free from carbolic acid, with which it might be adulterated. Thymol crystallizes in hexagonal forms, nearly or quite colorless; has an aromatic, thyme-like odor; a pungent, aromatic taste, with very slight caustic effects upon the lips, and a neutral reaction. It liquefies with camphor. It is soluble in about 1200 parts of water and 900 of boiling water; freely soluble in alcohol, ether, chloroform, benzin, glacial acetic acid, and oils.

Physiological Action.—In its effects, the oil of thyme is very much like the oil of peppermint, or origanum, and, in fact, is often commercially substituted for the latter. **Thymol** is a valuable antiseptic; it is less powerful than carbolic acid, but, on the other hand, is ten times less poisonous and much less caustic and irritating.

Thymol paralyzes the end-organs of sensory nerves in the skin and mucous membranes, but is a local irritant, and cannot be used well for the purposes to which cocaine is applied. It is a powerful antiseptic and disinfectant. Internally, in doses of gr. xx–xxx per diem, it causes epigastric heat, sweating, singing in the ears and deafness, and it escapes chiefly by the urine, which is increased, and becomes olive-greenish, as after carbolic-acid poisoning. It lowers arterial tension and reflex action, reduces the temperature, and may cause fatal coma. The nerve-centres of the cord are paralyzed by large doses.

Therapy.—Volkman and other surgeons have utilized thymol in antiseptic dressings as a substitute for the more toxic and less agreeable carbolic acid. It has been found a good application in eczema, psoriasis, and ringworm. An ointment containing 10 grains of thymol to the ounce is of service in acne and alopecia circumscripta. The addition of a little alcohol renders it possible to prepare a 1-to-1000 watery solution, which is efficient, and sometimes even needs to be weakened. A thymol solution is a useful injection in leucorrhœa. Thymol has been used both locally and internally, with success, in diphtheria. In solution it has been inhaled with benefit in laryngitis, and in phthisis it disinfects the sputum. It has also been administered internally in phthisis. Thymol may be inhaled with advantage in bronchitis, whooping-cough, and gangrene of the lung.

Kuessner reported good results from the internal use of thymol in diabetes, vesical catarrh, and infantile diarrhœa. Bufalini states that thymol, given in conjunction with a nitrogenous diet, restrains glycosuria, but is without effect when the patient is upon a mixed diet. Surgeon-Major Lawrie has reported two cases of chyluria of filarious origin successfully treated by means of 1 grain of thymol every four hours, increased gradually to 5 grains. Thymol has been employed with advantage in dentistry by Hartmann, of Münster. He applies it for the destruction of the tooth-pulp, and also in acute pulpitis.

Glycerin is a good vehicle, and, when properly diluted, a glycerite of thymol makes a good mouth-wash. In acute and chronic intestinal disorders, thymol has been employed by a number of clinical observers. Dr. Fred. P. Henry has used thymol, prepared with Castile soap, in gr. ii–iij doses every six hours. He reports that in typhoid fever the temperature falls, the stools become less frequent, cerebral symptoms diminish, and the tongue cleans off and becomes moist. Testi has employed thymol in 150 cases of typhoid. He says that the drug lowers temperature, diminishes tympanites, hinders fermentative processes in the intestinal tract, reduces the excretion of the urea, and increases the blood-pressure, without injury to the heart. Thymol has also been given internally in articular rheumatism.

Campi has used thymol with success as a tæniacide, according to the following method: 5 or 6 fluidrachms of castor-oil are given at bed-time, and the next morning, beginning early, 10 grains of thymol are given every fifteen minutes. The worm is said to be expelled entire.*

An infusion of thyme is of service in whooping-cough. It alleviates the paroxysms and shortens the course of the malady.

* Annual of the Universal Medical Sciences, 1890, vol. v, A-136.

Thymacetin.—Hoffmann, of Leipzig, has prepared a substance which bears the same relation to thymol as phenacetine to phenol. Thymacetin is a white, crystalline powder, slightly soluble in water. It has been given to dogs in doses of 30 grains without causing symptoms of intoxication. Jolly has experimented clinically with this product in a number of cases. It was without effect in true migraine, but in other cases of headache proved equal to phenacetine. It induced sleep in 16 out of 26 cases of insomnia, the average dose necessary being 7½ grains.*

TIGLII OLEUM (U. S. P.).—**Croton-Oil.**
Dose, ♏¼–ij.

Pharmacology.—Croton-oil is a fixed oil expressed from the seed of Croton tiglium (Euphorbiaceæ), an East Indian tree of moderate size. It is a pale-yellow, or brownish-yellow, rather viscid, and slightly fluorescent liquid, having a somewhat fatty odor, a mild, oily, afterward acrid, burning taste, and a feebly-acid reaction. When fresh it is soluble in about 60 parts of alcohol; the solubility and therapeutic activity increase by age. It is freely soluble in ether, chloroform, disulphide of carbon, olive-oil, and oil of turpentine. It contains **Tiglinic acid,** and also several glycerides of fatty acids.

Physiological Action.—The topical application of croton-oil to the skin causes irritation, inflammation, and a papular eruption, subsequently becoming pustular. Occasionally its application produces a general papulo-pustular eruption, scattered over the body. The pustules afterward dry up, and may give rise to scars if the oil was applied undiluted. The pustules are sometimes umbilicated, and, upon careless examination, the eruption might be mistaken for that of small-pox. When 1 or 2 drops of croton-oil have been swallowed vomiting may be produced, but in the course of an hour or two copious watery stools are passed, with symptoms of irritant poisoning, particularly when larger doses have been taken. Congestion of the gastro-intestinal tract occurs, and death may ensue from resulting inflammation of the bowels or peritonitis. Part of the oil diffuses into the blood, and produces glandular hyperæmia, and possibly an eruption upon the skin. Sometimes, when applied to the skin, the contrary is observed, the remedy passing through into the blood and causing watery discharges from the bowels. When combined with an alkali, or with some other agents, while it promotes the peristaltic action, the effects are more manageable and there is less danger of general toxic effects. It is a feeble hepatic stimulant, according to Rutherford. The toxic effects of croton-oil are combated by means of demulcent drinks and opiates.

* See British Medical Journal, March 19, 1892.

Therapy.—Croton-oil was formerly a favorite method of exciting counter-irritation, because it was convenient, simple, and rapid in its effects. On account of the danger of exciting suppuration and the resulting scars, it is rarely resorted to at present. If it be diluted with 3 parts of oil of sweet almonds it is a little less prompt, but the resulting inflammation is much milder, and several applications are sometimes required in order to bring out sufficient papules. It is valuable in disease of the chest, in incipient phthisis, pleurisy, bronchitis, neuralgia, rheumatism, and glandular swellings. Counter-irritation by croton-oil is likewise serviceable in chronic laryngitis, ovaritis, and metritis. Pustulation of the shaven scalp was formerly esteemed beneficial in meningitis, but is a method of treatment scarcely to be advocated. Its use in ringworm induces an artificial kerion, which soon subsides and the disease disappears. It should not be used for this purpose in delicate children, especially those under 6 or 7 years of age; it should also be applied to a small spot, a little larger than a dime, and it should be used only in chronic cases.

A liniment of croton-oil, officinal in the British Pharmacopœia, contains 1 part of this oil, 3½ parts of oil of cajuput, and 3½ parts of rectified spirit; 5 minims of this preparation to an ounce of olive-oil is a stimulant application sometimes used in alopecia. In other cases of skin affection occasional small doses of croton-oil are useful in clearing the alimentary canal.

Internally croton-oil is used as a drastic purgative in cerebral affections, apoplexy, etc., acute mania, and in cases of injury to the head. It is serviceable on account of its depletory and derivative effect in uræmic coma. In comatose conditions the dose may be simply dropped upon the tongue, and two or three times the usual dose are required. It is a better plan, however, to dilute the oil with a little lard, butter, sweet-oil or castor-oil. This medicament is valuable as a hydragogue cathartic in the treatment of anasarca, and in many cases where a complete evacuation of the bowels is desired, to bring about prompt diminution of arterial pressure and derivative action. In some instances it would be proper to give croton-oil in obstruction of the bowels from impaction of fæces, lead colic, or paralysis of the intestine. It may also be used as a vermifuge to expel tape-worms, but is so violent that the head is apt to be torn off and remain, unless an anthelmintic has been administered previously. Croton-oil should not be given to a pregnant woman, nor to a patient subject to hæmorrhoids.

TILIA.—Tilia, Linden-Tree.

Pharmacology and Therapy.—The inflorescence of the linden-tree of Europe (Tilia vulgaris, T. parviflora, and T. grandiflora), nat. ord.

Tiliaceæ, has a faint but pleasant odor and sweetish taste. The flowers are employed in making an aromatic water, which is used as a vehicle. in France especially.

TOLUTANUM. See Balsamum Tolutanum, page 465.

TONGA.

Dose, gr. xx–ʒj, in fluid extract.

Pharmacology.—A drug from the Fiji Islands, composed apparently of a mixture of several varieties of barks and roots, which are arranged in bundles. Drs. Ringer and Murrell, having made a series of experiments, which were reported in 1880, recommended it to the profession for further trial. It was supposed to be derived principally from the Raphidaphora vitiensis (Schott), a creeping-plant of the order Araceæ, and Premna taitensis (Schauer), a small tree of the natural order Verbenaceæ. A volatile alkaloid, **Tongine,** has been isolated from the former; the latter contains some volatile oil. The fluid extract, as made by Parke, Davis & Co., of Detroit, represents the therapeutic properties of this new drug.

Physiological Action.—Beyond slight drowsiness, Ringer and Murrell observed no systemic effects from an ounce and a half of the fluid extract, given within three hours. The pupils and the secretion of the mouth and skin were unaffected. The sensibility of the skin supplied by the fifth nerve remained unaltered. They saw no influence upon the pupil from a topical application. Dr. C. Bader states that the alcoholic extract, dropped into a healthy eye, seemed to increase the power of accommodation, without affecting the size of the pupil. He remarked, however, that in some cases large doses, taken internally, caused great dilatation of both pupils. Dr. T. H. Streets, U. S. N., reports the experience of himself and several colleagues. They found a decided diminution in the excretion of urea from 1-ounce doses, but no increase in the quantity of uric acid. The pulse, temperature, and pupils were unchanged. Two of the four experimenters noticed a tendency to cerebral congestion of short duration; one was slightly purged. The symptoms disappeared in about two hours, leaving no after-effects.

Therapy.—From the claims made by its introducers, it was thought that tonga would be a valuable addition to the list of antineuralgic remedies; but the attempt of a London drug-house to make a monopoly of the drug, which was defeated by a lawsuit, probably interfered with its use by the profession. In order that it should gain a secure position among remedies, it would be necessary to exercise supervision over the source of supply, so that it shall be of uniform strength and quality. Tonga is of marked service, however, in the treatment of neuralgia, especially when it involves branches of the fifth nerve. It has relieved

pain in a large majority of the cases in which it has been employed. The fluid extract should be given in 1-drachm doses, and repeated at intervals of about two hours, while needed. Tonga is rather slow in its action, and it requires about two hours for the full effects of the drug to be manifested. Dr. Bader has seen good results from the local use of tonga in asthenopia, rheumatic iritis, and photophobia.

TOXICODENDRON. See Rhus Toxicodendron, page 864.

TRAGACANTHA (U. S. P.).—**Tragacanth.**

Preparation.

Mucilago Tragacanthæ (U. S. P.).—Mucilage of Tragacanth.

Pharmacology.—Gum tragacanth is the product of trees growing in Asia Minor and Persia. It is a gummy exudation from Astragalus gummifer, and from other species of Astragalus (Leguminosæ, Papilionaceæ). It is in white, flattened bands, which, in drying, become curled or twisted, and are afterward broken in small pieces. It is horn-like, or translucent; and, when moistened with water, it is converted into a gelatinous mass. It consists of **Arabin, Bassorin,** and a little starch. Tragacanth paste is adhesive, and is used in practical pharmacy to paste labels on bottles, boxes, etc. It is also the basis of most of the officinal troches, and is of service in emulsions for the suspension and division of various powdered drugs, and for codliver-oil.

Therapy.—Only used in medicine, other than already stated, as a demulcent in pharyngitis, gastritis, and inflammation of the bowels. Large amounts do not agree with the stomach, unless some antiseptic agent, like creasote or naphthol, is administered at the same time, to prevent fermentation. It contains a little starch, and has slight nutritive properties.

Dr. George T. Eliot, of New York, has introduced bassorin as a base for the application of medicaments to the integument. Bassorin is a demulcent substance, tasteless and odorless, converted into a viscous mass by the addition of hot water. When mixed with water, glycerin, and dextrin, a bassorin paste is obtained, of jelly-like consistence and light-yellow color. This paste is neutral, undergoes no alteration, does not stain the skin or clothing, adapts itself perfectly to the affected surface, and may be readily removed at any time by the aid of water. Solid substances can be incorporated with bassorin paste in any desired proportion. Fluid preparations render it too liquid, while alcoholic solutions cause it to become hard and brittle.

M. Vindevogel recommends that, in preparing ointments containing large proportions of extracts or salts, 2 grammes of powdered gum tragacanth be added for each gramme of the water employed in dissolv-

ing the salt or extract. The fatty body is added after trituration, and by this method a homogeneous ointment of good consistence is made. In case, however, absorption of the unguent is desired, the bassorin of the gum proves a disadvantage.

TRIFOLIUM PRATENSE.—Red Clover.

Dose, ʒi–ij, in fluid extract or infusion.

Pharmacology.—The flower-heads of red clover, or Trifolium pratense (Leguminosæ), are fragrant and sweetish, containing a flavoring principle and sugar. The fluid extract and infusion are both employed.

Physiological Action.—It is considered diuretic and alterative.

Therapy.—The infusion of clover-tops is given to children suffering with whooping-cough, with good results. The fluid extract, containing alcohol, is employed externally in domestic practice for wounds and ulcers. A compound syrup of red clover, containing red clover, gr. xxxij; stillingia, gr. xvj; berberis aquifolium, gr. xvj; prickly-ash bark, gr. iv; burdock-root, gr. xvj; poke-root, gr. xvj; cascara amarga, gr. xvj; potassium iodide, gr. viij, in each fluidounce of the syrup, has been furnished to meet professional demands by Parke, Davis & Co., to take the place of several proprietary preparations of uncertain composition. It is useful as an alterative in syphilis, struma, and some chronic forms of skin disease.

TRILLIUM.—Trillium, Beth-Root.

Dose, ʒi–ij, in the form of fluid extract.

Pharmacology.—The Trillium erectum (Liliaceæ), growing in woody places in the Northern United States, contains in its rhizome an acrid principle, with tannin, etc.

Physiological Action.—It is astringent, tonic, and antiseptic.

Therapy.—In genito-urinary affections, hæmaturia, and pulmonary affections, trillium is used in the form of a fluid extract, which is also used externally for wounds.

TRIMETHYLAMINI HYDROCHLORAS.—Hydrochlorate of Trimethylamine.

Dose, gr. iii–x.

Pharmacology.—Trimethylamine, with dimethylamine and tetramethylammonium hydrate, are compound ammonia bodies, discovered by Hoffmann. Dimethylamine is a combustible gas. Trimethylamine is also a gas at ordinary temperatures, with a strong ammoniacal odor and an intense alkaline reaction; with methyl iodide it forms a salt which, being treated, in solution, with silver oxide, yields silver iodide and tetra-methylammonium hydrate. The latter body, being subjected to dry distillation, decomposes into trimethylamine and methyl alcohol.

Trimethylamine, (CH_3) N_3, exists already formed in Arnica montana, Chenopodium vulgaris, in the flowers of Cratægus oxyacantha, in ergot, in codliver-oil, and in various decomposing albuminous compounds, particularly herring-brine, guano, urine, and coal-gas tar. Vincent extracted large quantities from the residue of the distillation of fermented beet-juice, or the refuse left after making beet-sugar. Propylamine is usually an impure trimethylamine in solution; the name properly belongs to another, though similar, compound. The hydrochlorate of trimethylamine is a comparatively stable salt and has been used in medicine.

Physiological Action.—Trimethylamine hydrochlorate, in strong solution, acts as a caustic; when applied to the lip it causes a burning sensation and the epithelium afterward exfoliates, leaving a superficial ulcer. Internally, it acts as an irritant to the digestive tract, and to its local action Dujardin-Beaumetz ascribes the cause of the fatal result from a large dose; he states, however, that as much as 75 grains may be given without fatal effect. Doses of about 20 grains, repeated several times, cause, in rabbits, general distress, tremor, with loss of motive power, hyperæsthesia, and increased reflex excitability; the same amount injected under the skin produces death. In the human subject, the first effect, from moderate doses, is increase of the heart's action, but soon, especially if full doses are given, the opposite condition is set up; the pulse-rate and temperature are lowered. No colic or diarrhœa occurs, but the odor and taste are so unpleasant that the remedy is often rejected by the stomach. No increase of perspiration or of the urine is reported.

Combemale and Brunelle state that trimethylamine provokes an excessive secretion of saliva and increases the alkalinity of that fluid. The nasal and lachrymal secretions are augmented and a slight albuminuria is produced. Dujardin-Beaumetz states that the excretion of urea is diminished by the drug. Fatal narcosis may occur from retention of carbonic-acid gas in the blood, but Phillips ascribes death more commonly to the depressing effects of the remedy upon the spinal cord.

Antidotes to Toxic Action.—The proper treatment of poisoning would be by external heat, and counter-irritation by mustard or turpentine, and opium and belladonna or atropine to control the symptoms. The tincture of capsicum, with digitalis, strophanthus, or nux vomica, would be useful in counteracting the effects upon the circulation.

Therapy.—This drug was introduced for the purpose of treating acute rheumatism, and in cases with high temperature and active circulation it has produced good effects. It has also been used as an antipyretic in other maladies, in doses of 2 grains repeated every three or four hours. It should be given in capsules or in solution with peppermint-water, well diluted. Trimethylamine is of service sometimes in chronic

rheumatism, in which it has been also used as a liniment, 1 part being mixed with 3 parts of glycerin. It has been administered in gout.

TRITICI FARINA.—Wheat-Flour.

Pharmacology.—The Triticum vulgare (Graminaceæ), or wheat, is a well-known source of food. The farina is a fine, white flour, prepared from the seed; it is impalpable, inodorous, and of insipid taste. It consists of starch, 70 per cent.; gluten, 12 per cent.; fixed oil, 2 per cent.; together with cellulose, sugar, and water. It yields about 2 per cent. of ash, containing 50 per cent. phosphoric acid. It is highly nutritious, and contains a large amount of nitrogenous matters. With cold water, it forms a granular, pasty mass, not very adhesive; but, with hot water, the starch-granules swell up and burst, making a homogeneous, jelly-like mixture.

Physiological Action.—It is bland and unirritating, and forms a good antidote, when mixed with water, in case of corrosive poisoning. The starch is antidotal to iodine and its preparations.

Therapy.—Wheat-flour dusted upon an inflamed surface coats it over with a layer which protects it from the air. It is a convenient application to recent burns and scalds, or erysipelas; but in hot weather it should be associated with some antiseptic to prevent the development of insects, the ova or larvæ of which very often find their way into flour, especially if exposed to the air. It has been asserted that a tablespoonful of flour, in a glass of cold water, swallowed night and morning, will check the development of boils. As the basis of bread, wheat-flour enters into the question of nourishment for the sick, which belongs more to the province of the nurse than the physician, although the medical attendant should be perfectly familiar with the digestive and nourishing qualities of any preparation which may be submitted to his judgment, in order to pronounce upon its fitness, or the reverse, for the patient.

TRITICUM (U. S. P.).—**Couch-Grass.**

Dose, ʒi–iv, in infusion or fluid extract.

Pharmacology.—The rhizome of Triticum repens (Graminaceæ). It should be gathered in the spring and deprived of its rootlets. It is a common perennial, growing in the fields, and regarded as a weed. The rhizome contains **Triticin,** a gum, sugar (22 per cent.), but is devoid of starch and resin.

Physiological Action.—It is demulcent and diuretic.

Therapy.—Triticum may be given, in decoction, as a demulcent drink in fevers. This preparation, or the fluid extract, is useful in irritability of the bladder and chronic cystitis. In the latter affection, Sir Henry Thompson recommends a pint of the infusion or decoction, to be

taken during the day. In chronic cystitis, irritable prostate, and in gleet, the writer has prescribed the following with triticum :—

℞ Ext. tritici fl.,	f℥iij.
Tinct. belladonnæ,	♏lxxij.
Sodii bicarbonatis,	ℨij.

M. Sig. : A teaspoonful in water every two or three hours.

The following combination relieves irritable bladder or cystitis in women :—

℞ Potassii citratis,	℥ss.
Extr. tritici fl.,	
Tinct. belladonnæ,	āā f℥j.
Extr. buchu fl.,	f℥ss.
Aquæ,	q. s. ad f℥iv.

M. ft. sol.

Sig. : Teaspoonful in a wineglassful of water three times a day.

Tincture of hyoscyamus may be substituted for the tincture of belladonna.

The fluid extract is a pleasant, malt-like preparation, has some nutritive properties, and possibly may be of value in chronic bronchial disorders. The decoction is one of the many popular remedies for consumption.

TUBERCULINUM.—Tuberculin, Koch's Lymph.

The course of speculation and experiment has, for a number of years past, been directed toward the possibility of preventing or curing a disease by the injection of certain specific chemical substances produced by the development of the causative bacillus of the disease. The subjects of immunity, prophylaxis, and cure have been earnestly studied in connection with various infectious diseases, notably tuberculosis, pneumonia, and tetanus. A therapeutical method which seeks to arrest the progress of tuberculosis, especially when proposed by so eminent a man as Professor Koch, challenges the attention of the medical mind. The first edition of this work, therefore, contained a brief account of tuberculin, then recently introduced and undergoing the ordeal of clinical experimentation. The undoubted reaction which, in the vast majority of tuberculous cases, followed the injection of this potent fluid was described, together with the method of its therapeutical application, the evil consequences which had already been noticed in some instances, and the contra-indications to its employment. The writer was impressed by the thought that, whatever be the fate of this particular fluid as a medicinal agent, it was, at any rate, a step forward upon the path which shall lead us to a clearer comprehension of infectious processes, their limitations, or their cure. The fact that tuberculin does not destroy the

bacilli of the disease, but occasions their dissemination, was recorded as throwing grave doubt upon the ultimate efficacy of the proposed method. The period had evidently not yet arrived, as the author had already written,* to express a decided opinion regarding the efficacy of the new fluid. Improvement was undoubtedly produced in cases of lupus and in the first stage of pulmonary disease. Would, however, the amelioration endure, or would it be but temporary? Such questions could manifestly not be answered at that date. More than a year, however, has now elapsed, and our fears have been realized. Though improvement often followed injection of the lymph, relapses have been the rule, continued amendment the exception. Though powerful, the fluid has been found not infallible as a diagnostic agent, since in some cases of tuberculosis it fails to excite reaction, while constitutional effects have at times followed its use in other diseases. Cases in which the author employed the fluid were certainly remarkably benefited for a time, but one and all have relapsed, and are now in about the same condition as they would have been under the usual approved methods. This experience, which is common to the writer and many other observers, applies equally to cutaneous, glandular, articular, and pulmonary tuberculosis.

The failure of tuberculin, however, should not lead us to overlook a significant fact. It is not merely a powerful, even poisonous, fluid, but it has the peculiarity of exerting a specific action upon tuberculous tissue. The problem is therefore suggested, whether its toxic principles can be eliminated, and only those retained which act specifically, and it may be beneficially, upon affected parts?

Tuberculocidin.—Professor Klebs, of Zürich, has endeavored to solve this problem by separating from crude tuberculin toxic bodies, leaving in solution an albumose, which may be extracted by alcohol, and which he conceives represents the beneficial properties of crude tuberculin. It can be safely employed, both in animals and men, in much larger doses than Koch's lymph. Professor Klebs has often administered 0.5 to 1 cubic centimetre to tuberculous men without the production of notable increase of temperature. Large doses of tuberculocidin may give rise to a slight febrile reaction, which soon, however, subsides. This substance is believed to occasion an irregular, horny degeneration of the bacilli. Professor Klebs has treated local tuberculosis, especially laryngeal, by means of tuberculocidin with very encouraging result. In a series of seventy-five cases of pulmonary disease, he estimates 18.6 per cent. as cured and 60 per cent. as improved. An incidental advantage

* Medical Bulletin, January, 1891, p. 27.

of this method is, that the patient can generally pursue his occupation uninterrupted by the treatment.*

TUSSILAGO.—Tussilago, Colt's Foot.

Dose, ʒi–ij, in decoction or fluid extract.

Pharmacology.—The leaves of Tussilago farfara (Compositæ), growing in cold, clayey banks, in the Northern and Middle States, contain **mucilage,** tannin, and a **bitter extractive.**

Physiological Action.—Tussilago is demulcent, tonic, and, as the name indicates, it is also deemed expectorant or pectoral.

Therapy.—In cough attending chronic pulmonary affections, chronic bronchitis, etc., colt's foot is used, often in combination with licorice, or horehound. The fresh leaves are applied in the form of a poultice to scrofulous ulcers. The fluid extract is a stomachic, and has some tonic properties, owing chiefly to the alcohol which it contains.

ULMUS (U. S. P.).—**Elm.**

Preparation.

Mucilago Ulmi (U. S. P.).—Mucilage of Elm (dried bark 6, boiling water 100 parts).

Pharmacology.—The inner bark of Ulmus fulva (Urticaceæ), or elm, a handsome forest tree of North America, contains **mucilage** principally.

Physiological Action.—Elm-bark is used as a demulcent externally and internally. The dried bark, in flat pieces or strips, is sometimes chewed, as the taste is not unpleasant, and the mucilage moistens the mouth and throat.

Therapy.—Poultices of ground elm-bark, with lead-water, are serviceable in erysipelas and various forms of local inflammation; they are used cold or hot. Internally the mucilage may be given *ad libitum* in stomach and bowel disorders, and in painful affections of the urinary passages, dysuria, etc. Pieces of elm-bark, of suitable size and shape, may be made into tents for the dilatation of fistulæ, and in the treatment of uterine affections.

URETHAN.—Urethan. ($C_2H_5O, NH_2, CO.$)

Dose, gr. viii–ʒj.

Pharmacology.—Urethan is a recently-introduced hypnotic. It is the ethylic ether of carbaminic acid, and is in the form of very soluble, tasteless, white crystals.

Physiological Action.—Von Jäksch † found it markedly hypnotic in doses of 7½ to 15 grains in various pathological conditions. Urethan is

* See Die Behandlung von Tuberkulose mit Tuberculocidin. Vorläufige Mitteilung von Prof. Dr. E. Klebs in Zürich. Fünfte Auflage, Hamburg und Leipzig, Verlag von Leopold Voss, 1892, and Medical Bulletin, July, 1892, p. 285.

† Jahresbericht der Pharm. Therap., 1885.

not an analgesic, and does not relieve the neuralgic pains of locomotor ataxia, for instance. It is considered unsuitable for alcoholic delirium or insanity, since we have agents better suited to control these conditions.

Therapy.—In adults, it is recommended for use as a sedative and hypnotic, where other agents cannot be used, in doses of gr. xv, or less, every two hours. Demme regards it especially suited to children, giving 4 grains at the age of 1 year as a true hypnotic. He considers that larger doses are safe even in weakly children, as he has seen no effect upon the circulation, respiration, digestion, or nerve-centres. As an enema, he used it successfully in eclampsia. Abbott reports a case of tetanus cured in two days, from 9 grains of urethan every two hours, with $30\frac{1}{2}$ grains administered at night.

Maresti, also, successfully treated a case of tetanus by means of urethan. Crozer Griffith looks upon urethan, in ordinary dose, as an uncertain and unreliable hypnotic, though in large dose it may at times prove useful.* Chloral and urethan may be combined, forming **Chloral-Urethan,** or **Somnal. Uralium**† appears to be a similar substance to, if not identical with, somnal. (See page 911.)

USTILAGO (U. S. P.).—**Corn-Smut, Corn-Ergot.** (See page 736.)

UVA URSI (U. S. P.).—**Uva Ursi, Bearberry.**

Dose, ʒi–ij.

Preparations.

Extractum Uvæ Ursi Fluidum (U. S. P.).—Fluid Extract of Uva Ursi. *Dose,* fʒss–j.
Decoctum Uvæ Ursi (U. S. P.).—Decoction of Uva Ursi (1–17). *Dose,* f℥ss–ij.

Pharmacology.—The leaves of Arctostaphylos Uva Ursi (Ericaceæ), or Bearberry, a small herb of North America and Europe, contain **tannic** and **gallic acids,** to which they owe their astringency. Three principles have been separated, **Arbutin, Ericolin,** and **Ursone,** the latter being tasteless, the others bitter and crystallizable, soluble in water and alcohol.

Physiological Action.—The preparations of Uva ursi are astringent, and in proper dose carminative and tonic, but may constipate the bowels. The astringent principles pass off by the kidneys and are sedative to the urinary passages. An overdose of uva ursi produces vomiting, purging, and genito-urinary irritation, with, sometimes, vesical tenesmus and hæmaturia.

Therapy.—The infusion or decoction of uva ursi is a valuable agent in treating irritation of the bladder, strangury, dysuria, pyelitis, or cystitis. It may be combined with an alkali as follows:—

* Annual of the Universal Medical Sciences, 1889, vol. v, p. A-150.
† Gazetta degli Ospitali, Milan, February 6, and British Medical Journal, March 16, 1890.

℞ Sodii bicarbonat., ... f℥ij.
Decocti uvæ ursi, ... f℥viij.

M. Sig.: Take a tablespoonful every two hours for vesical irritation, or in the strangury following the use of a blister.

Uva ursi has some reputation in calculous affections, gravel, etc. **Arbutin** is used in doses of gr. ii–v as a diuretic in dropsy, and also in urethritis. Arbutin appears to be devoid of toxic properties and communicates to the urine a greenish hue, which grows darker if the fluid is allowed to stand. It has been asserted by Dr. Harris, of Alabama, that uva ursi causes uterine contractions, and can be used as a substitute for ergot, but further observations are needed to establish its value in this direction. Uva ursi has been given with success in leucorrhœa, menorrhagia, chronic dysentery, and bronchorrhœa, and is reported to have been beneficial in diabetes.

VALERIANA (U. S. P.).—**Valerian, Valerian-Root.**
Dose, gr x–xxx.

Preparations.

Abstractum Valerianæ (U. S. P.).—Abstract of Valerian. *Dose,* gr. v–xx.
Extractum Valerianæ Fluidum (U. S. P.).—Fluid Extract of Valerian. *Dose,* f℥ss–j.
Oleum Valerianæ (U. S. P.).—Oil of Valerian. *Dose,* ♏ii–v.
Tinctura Valerianæ (U. S. P.).—Tincture of Valerian (20 per cent.). *Dose,* f℥i–ij.
Tinctura Valerianæ Ammoniata (U. S. P.).—Ammoniated Tincture of Valerian (powdered valerian-root 20, aromatic spirit of ammonia, to make 100 parts). *Dose,* f℥i–ij.
The officinal valerianates are of ammonia, iron, quinine, and zinc.

Pharmacology.—The rhizome and rootlets of Valeriana officinalis (Valerianaceæ), a native of Europe, but cultivated in this country. The root contains a **volatile oil**, which is officinal, and by oxidation yields **Valerianic acid.** When the drug is recently dried it contains more volatile oil and less valerianic acid; as it gets older, the oil decreases and the proportion of valerianic acid increases, while the odor becomes more marked. Valerianic acid is a colorless, oily fluid, with an odor resembling that of the drug, and a strongly acid and burning taste. It also contains **Valeren,** which is a terpine, and valerian camphor, with resin and water, constituting **Valerol,** which is changed by contact with air into valerianic acid. An alkaloid has been extracted from valerian-root by M. Waliszewski, of Clichy, and named **Chatinine** by its discoverer, in honor of M. Chatin, late Director of the School of Pharmacy of Paris. The same chemist has also isolated a second alkaloid termed **Valerine.** Valerianic acid may be made artificially by the oxidation of amylic alcohol, and it is from this acid that the valerianates are formed; but it does not quite correspond with the natural acid in its physiological effects. The oil is the best form of the drug, and can be given in cinna-

mon-water and mucilage. The ammoniated tincture is a valuable preparation, owing to the stimulating and carminative effects of the ammonia. The valerianates are rarely used, as their effects do not correspond with those of valerian. An elixir of the valerianate of ammonia, however, is an excellent preparation when well made, the odor and taste of the salt being covered by the addition of vanilla and a little chloroform; it contains 2 grains to the fluidrachm, and is given in tablespoonful doses. In this a certain part of the result must be attributed to the alcohol which it contains.

Physiological Action.—Valerian is antispasmodic and slightly stimulating to the circulation. It reduces irritability and reflex contractions, and is a sedative to the spinal cord. In small quantities, valerian excites a sensation of warmth in the stomach, improves the appetite and digestion. Bouchard states that valerian materially decreases the amount of urea excreted. Large doses cause nausea and vomiting, diarrhœa, frequent micturition, tenesmus, increased discharge of urates, with giddiness, hallucinations, and mental disturbance, the oil being a paralyzing agent to the great nerve-centres. Elimination takes place through the kidneys, lungs, and skin.

Therapy.—There are no local applications, and the internal use has practically become limited to the treatment of nervous disorders in women, especially nervous headache and hysteria, or hystero-epilepsy. The following prescription, containing valerian, is serviceable :—

℞ Tinct. ammon. valerian.,
Spiritus ætheris comp.,
Tinct. humuli, ... āā f℥ij.
M. Sig.: Two teaspoonfuls in water, every hour or two.

The various nervous disturbances which occur at the menopause are relieved by the administration of valerian. This remedy is also of service in pruritus dependent upon disorder of the nervous system. Valerian is of advantage in allaying the nervous phenomena of exophthalmic goitre. Favorable reports have been made of its utility in diabetes insipidus and mellitus. The improvement, however, does not continue. In various spasmodic disorders in children, such as convulsions or chorea due to worms, nervous cough, whooping-cough, and in delirium with depression, it has been beneficially employed. The oil has been given to arouse patients from coma during the progress of a fever, like typhus. The valerianate of morphine is sometimes used with the idea that it is better borne than the officinal salts. The valerianate of zinc has been used in nervous diseases, chorea, epilepsy, and neuralgia, in doses of gr. ii–iij, with considerable success.

VERATRINA.—Veratrine.

Preparations.

Oleatum Veratrinæ (U. S. P.).—Oleate of Veratrine (2 per cent.).
Unguentum Veratrinæ (U. S. P.).—Ointment of Veratrine (4 per cent.).

Pharmacology.—Veratrine is an alkaloid, or mixture of alkaloids prepared from the seeds of Asagræa officinalis (Melanthaceæ), or Veratrum sabadilla.

Physiological Action.—This agent is very irritating to mucous membranes; it powerfully depresses the heart's action, reduces the temperature, and causes fatal collapse. It lowers the sensibility of the sensory nerves.

Therapy.—It is not used internally; but, applied to the affected spots, in the form of oleate or ointment, it quickly relieves neuralgic and myalgic pains. Veratrine ointment mitigates the pain of herpes zoster, and is used in weakened form in infantile paralysis, for the purpose of promoting the nutrition of the affected muscles. This preparation is beneficially applied in cases of chronic swelling and stiffness of joints, and to the affected articulations in the beginning of a paroxysm of gout. Veratrine ointment is useful in pleurodynia or chronic pleurisy, alopecia circumscripta, chloasma, and pediculosis. For ordinary use the officinal ointment is too strong, and should be reduced once or twice. Care should be taken not to introduce any of the ointment into the eyes, or violent conjunctivitis may be set up. Veratrine has been given internally in rheumatism, neuralgia, etc., in doses of gr. $\frac{1}{60}$–$\frac{1}{12}$, but is too depressing. Taylor records that alarming symptoms have been produced by $\frac{1}{18}$ grain of veratrine.

VERATRUM VIRIDE (U. S. P.).—**Veratrum Viride, American Hellebore.**

Preparations.

Extractum Veratri Viridis Fluidum (U. S. P.).—Fluid Extract of Veratrum Viride. *Dose*, ℳi–xl.

Tinctura Veratri Viridis Fluidum (U. S. P.).—Tincture of Veratrum Viride (50 per cent.). *Dose*, ℳiii–f℥j.

Pharmacology.—The rhizome and rootlets of Veratrum viride (Melanthaceæ) are officinal. It is an indigenous plant; from its place of growth being called swamp-hellebore, also Indian poke, or poke-root, but is an entirely different species from phytolacca, which yields the poke-berries and poke-root of the pharmacopœia. Veratrum-viride root contains **jervine, pseudo-jervine,** and **cevadine,** principally; but traces of **rubi-jervine, veratrine,** and **veratralbine** are also found. Veratroidine, which was formerly regarded as one of its constituents, is thought by Brunton to be, in all probability, simply rubi-jervine with resin. Jervine has not been used medicinally, but would probably prove valuable, as it does not produce vomiting. It forms crystallizable salts with acids.

Physiological Action.—The action of veratrum viride is due to the jervine and other alkaloids which it contains. In small doses of the fluid extract, the pulse is lowered in force, without at first affecting its frequency; it afterward becomes slow, soft, and moderately full, and liable, upon the patient making any exertion, to become rapid, small, and even imperceptible. Nausea and vomiting frequently occur, with much muscular weakness. Large doses bring on a condition of collapse, with retching, cold and clammy skin, imperceptible pulse, intense muscular weakness, giddiness, and gradual loss of consciousness. **Jervine** was found by Dr. H. C. Wood to greatly lessen the functions of the spinal cord and medulla, especially the vasomotor centre, and at the same time to cause convulsions by irritation of motor centres in the brain; the principal effects being shown in muscular weakness, followed by tremors, lowered blood-pressure, and slow pulse. Bartholow attributes death to asphyxia from paralysis of muscles of respiration, and considers the cerebral effects to be due to the accumulation of carbonic acid in the blood. It is possible that the convulsions may really be due, in part, to cerebral anæmia, and death may occur from syncope.

Treatment of Toxic Effects.—Notwithstanding the very formidable symptoms produced by large doses, fatal effects are rare. An ounce of the tincture has been swallowed without producing death, probably because the prompt emesis which was excited caused the rejection of the most of it. Ordinarily the symptoms are rapidly relieved by the suspension of the remedy and the administration of opium and stimulants.

Therapy.—The form and mode of administration is of some importance. The fluid extract is a saturated tincture, and resembles, in this respect, Norwood's. The tincture is preferred by Bartholow in doses of about 5 drops, not at a longer interval than two hours. The recumbent posture must be strictly enforced, in order to avoid the emetic effects, which are so depressing that the remedy is never used for this purpose. In various forms of overaction of the heart, hypertrophy, irritable heart, and abnormal tension of Bright's disease, it is of great service. It should not be used where there are valvular lesions and the cardiac muscle is enfeebled, or where there is dilated or fatty heart. In aneurism, in conjunction with the proper regimen and rest in bed, veratrum viride favors coagulation of the blood and diminishes the pressure, the effects being carefully watched so as to avoid vomiting. In exophthalmic goitre or Basedow's disease, Germain Sée, Guyat, Huchard, and others have had successful results from the use of 20 to 25 drops daily of the tincture.* In the first stage of pneumonia and acute congestions of the viscera, there is an accumulation of favorable testimony; it directly

* Annual of the Universal Medical Sciences, 1890, vol. v, p. A-137.

reduces the tendency to accumulation of blood, and diminishes the danger of exudation. In pneumonia, when taken at the very beginning, and doses of ♏x–xv of the tincture given every two hours or less, until there is a reduction in the pulse-rate and temperature, veratrum will produce the best results; it is useless after fibrinous deposit has taken place. Green veratrum has been employed as an antipyretic in acute rheumatism. In active hæmorrhage or acute mania, in the plethoric, this remedy also moderates the force of the circulation, and may at once check the seizure. In typhoid fever it is inadmissible, except in cases of hyperpyrexia with active delirium. In puerperal convulsions it has been given in doses of half a drachm of the fluid extract every fifteen minutes until vomiting is produced, or the convulsions cease. Veratrum viride, in small doses, often rapidly relieves or cures tonsillitis, especially when combined with morphine:—

℞ Tinct. veratri viridis,	♏xvj vel xxxij.
Morphinæ sulphatis,	gr. j.
Aquæ menth. pip.,	f℥ij.

M. Sig.: A teaspoonful every hour or two, until relieved.

Phillips reports that this remedy seemed to relieve a case of persistent priapism after antimony, belladonna, and bromides had failed.

VERBASCUM.—Mullein.

Pharmacology.—Verbascum thapsus (N. O. Scrophulariceæ), or mullein-plant, grows by the roadside and in neglected fields. Its leaves are large and woolly, and it bears yellow flowers in dense spikes. The leaves contain a large proportion of mucilage, and a small quantity of volatile oil exists in the flowers.

Physiological Action and Therapy.—Mullein is demulcent, expectorant, and contributes to nutrition. It has long enjoyed a popular repute in Ireland as a remedy in pulmonary affections. Quinlan esteems it of considerable value in phthisis and other wasting diseases. He states that this plant relieves cough, diminishes expectoration, and increases the bodily weight. It is given in the form of an infusion made with milk, 4 ounces of the fresh, or a corresponding quantity of the dry, leaves being boiled for ten minutes in a pint of fresh milk. This quantity is to be drunk thrice daily, while still warm. Though the milk doubtless adds to the effect, Quinlan saw benefit result from administration of the juice alone. The taste is unpalatable and is disguised by the milk. Mullein has likewise been used in diarrhœa, irritable bladder, and cystitis. The flowers are said to remove warts. They are applied, freshly taken from the calyx, by pressing and rubbing upon the growth. In aphonia dependent upon laryngeal irritation dried mullein-leaves have

been smoked with alleged advantage. Mullein has been employed as an enema in dysentery and as a poultice for hæmorrhoids.

VIBURNUM PRUNIFOLIUM.—Black Haw.

Preparations.

Extractum Viburni Fluidum.—Fluid Extract of Viburnum. *Dose*, ℳ xv–f℥j.
Pulvis Extracti Viburni.—Powdered Extract of Viburnum. *Dose*, gr. iii–x.
Extractum Viburni.—Extract of Viburnum. *Dose*, gr. iii–x.*

Pharmacology.—Viburnum prunifolium (Caprifoliaceæ), or black haw, is a tree which is common in the United States east of the Mississippi. Its height varies from 10 to 30 feet. It is generally found upon rocky hill-sides, in rich soil. Its trunk rarely exceeds 6 inches in diameter. The wood is heavy, hard, and brittle, reddish-brown in color. The bark of the root is the portion employed. The chemical constituents of the bark are **Viburnic acid,** identical with valerianic acid; **Viburnin,** a bitter, resinous body, and also sugar and tannic, oxalic, citric, and malic acids.

Physiological Action.—It sometimes causes nausea and vomiting, but when retained it is a tonic, astringent, antispasmodic, and nerve-sedative. No exact study seems to have been made of the physiological action.

Therapy.—The attention of the medical profession was drawn to viburnum by Dr. Phares, of Mississippi, in 1866. This writer described it as "nervine, antispasmodic, tonic, astringent, and diuretic," and of particular value in the prevention of abortion, whether habitual or otherwise, whether threatened from accidental cause or criminal drugging. An abundance of testimony on both sides of the Atlantic has accumulated to confirm this statement as to its value in threatened abortion. Given before the membranes have been detached, it rarely fails to quiet uterine action, provided the fœtus be living. Black haw affords relief to the after-pains and the so-called "false pains." It has been found of value in the treatment of dysmenorrhœa, especially when associated with profuse flow, and in the absence of serious mechanical obstruction. Even in the latter case, however, it is often able to diminish the pain. In spasmodic dysmenorrhœa it is thought to be more efficient when combined with Jamaica dogwood. Dr. Allan S. Payne obtained very good results from viburnum in severe cases of membranous dysmenorrhœa. In amenorrhœa dependent upon anæmia it is likewise of service. In menorrhagia and metrorrhagia due to systemic causes, as malaria, anæmia, disease of heart or liver, this remedy has proved particularly valuable. The uterine hæmor-

* Under the name of Liquor Sedans, Parke, Davis & Co. have offered a substitute for certain copyrighted preparations. Each fluidounce contains 60 grains each of black haw and golden seal, 30 grains of Jamaica dogwood, combined with aromatics, q. s., making an elixir, or compound extract, of viburnum. *Dose*, f℥ij.

rhages which attend the menopause, as well as the various vasomotor and nervous disorders so frequent at that period, are materially relieved by viburnum. Dr. R. D. Style, of Richmond, Va., in charge of the small-pox hospital of that city, remarks that the occurrence of the catamenial epoch during an attack of small-pox is frequently a serious and troublesome complication, but that the use of viburnum in such cases obviates the necessity of a resort to mechanical methods of checking hæmorrhage. The vomiting of pregnancy has occasionally been relieved by this remedy, and its use has sometimes been attended with success in sterility of the female. For its astringent effects viburnum has been given in diarrhœa and dysentery. Dr. R. L. Payne, Jr., has seen marked reduction of the tremor of paralysis agitans caused by the administration of viburnum. He suggests that its antispasmodic virtues should render it useful in the convulsions of hysteria and hystero-epilepsy, and in petit mal. Locally, the diluted fluid extract has been used as a gargle in aphthous sore mouth and as a lotion to indolent ulcers.

The **Viburnum opulus,** or cramp-bark, belongs to the same natural order as the preceding, and is used in similar doses. It is used only in the form of fluid extract, and is given to prevent or relax cramps of all kinds resulting from hysteria, dysmenorrhœa, or pregnancy.

VIOLA TRICOLOR.—Heart's Ease, or Pansy.

Preparation.

Extractum Violæ Fluidum.—Fluid Extract of Viola Tricolor. *Dose,* f℥ss–ij.

Pharmacology.—Viola tricolor (Violaceæ), heart's ease, or pansy, is a native of continental Europe and cultivated in the United States. Its medicinal virtue resides in the leaves of the wild plant. Mandelin has discovered that the plant contains salicylic acid. It likewise possesses a small quantity of an emetico-cathartic principle, **Violin** ; also existing in Viola odora, or sweet violet. The syrup of viola, made from violets, is a pale-violet-colored, agreeable vehicle for medicines for æsthetic patients.

Physiological Action and Therapy.—The little that has been recorded concerning the physiological action of viola betrays a certain resemblance to the effects of salicylic acid. Viola is said to produce a sense of confusion and dullness in the head, with headache; some dimness of vision; salivation; vesical tenesmus, with frequent and profuse micturition; turbid urine, offensive to the smell; a sense of heat over the whole body; sweats, itching, and nettle-rash. The first publication upon the action of this drug seems to have been by Schrack, in 1779, who recommended it as a specific remedy in crusta lactea, or infantile eczema of the head and face. In Germany, it gradually fell into disuse, but is still employed in France, and the advocacy of Professor Hardy induced Dr. H. G.

Piffard, of New York, to make use of viola in eczema. It is used as an internal medicine. An infusion in milk of the fresh herb, deprived of root and flowers, was long employed. Hardy advised a combination with senna. Piffard now makes use of the fluid extract, and speaks favorably of its results. It is most successful in the second stage, with serous or sero-purulent exudation and crusting. Full doses, given in acute eczema, cause aggravation and extension of the eruption, with increased local heat and itching. These effects continue several days. In order to avoid them, Piffard advises that but from 1 to 5 drops should, in beginning, be given to a young child, once or twice a day. If no improvement occur, the dose may be increased; if aggravation result, the drug should be discontinued for a few days, and then resumed in smaller quantity. A larger commencing dose (from 10 to 15 drops) is required in subacute or chronic eczema. In adults, ½ drachm to 2 drachms may be given as the beginning dose in subacute cases. It should be taken in a small quantity of water, on an empty stomach, and, if possible, about half an hour before meals.

VISCUM.—Mistletoe.

Dose, gr. x–ʒj, in decoction, fluid extract, or tincture.

Pharmacology.—The mistletoe was formerly known botanically as Viscum, but is now called Phoradendron (N. O. Loranthaceæ); the European variety is P. album, the American P. flavescens. They are parasitic plants, the latter growing on oaks, elms, etc. The plant contains mucilage, fixed oil, resin, starch, etc., and **Viscin** ("bird-lime" or "bird-glue"), a viscous, glutinous substance; also found in other plants.

Physiological Action.—Mistletoe is a valuable oxytocic and nerve-sedative. It is a cardiac tonic resembling digitalis in its action upon the cardiac muscle. The berries cause emesis and catharsis, with prostration, bloody stools, and convulsions in children who have eaten them.

Therapy.—In epilepsy, chorea, asthma, and many other nervous affections, mistletoe deserves further trial. In weak heart, with insufficient contractile force, it has some value; in uterine hæmorrhage it has been found useful. Viscum has likewise been employed in dropsy and amenorrhœa. It is of service in menorrhagia, and has been used during labor to excite uterine contractions. The use of mistletoe during labor has been earnestly advocated by Dr. W. H. Long, of the United States Marine-Hospital Service, upon the ground of its rapidity of action and its ability to excite intermittent contractions.

VITELLUS (U. S. P.).—**Yelk of Egg.**

Preparation.

Glyceritum Vitelli (U. S. P.).—Glycerite of Egg-Yelk (fresh egg-yelk 45, glycerin 55 parts). External use.

Pharmacology.—Vitellus is the yelk of the egg of the domestic fowl Gallus bankivus (var. Domesticus; class, Aves; order, Gallinæ). It contains **Vitellin,** resembling casein, **Lecithin,** a phosphorized fat, with albumin, a yellow and fixed oil, cholesterin, salts, sugar, etc.

Physiological Action.—Egg-yelk is a bland, oily substance, very useful in making emulsions. It is highly nourishing, and, as it contains phosphorus, it is especially restorative to the nervous system. The glycerite is a good vehicle for codliver-oil, for children.

Therapy.—Vitellus is beneficial in consumption and wasting diseases, as a special food for the nervous structures, and it can be given in conjunction with codliver-oil, or as a substitute for it. The glycerite is a good application to sore nipples, chapped lips and hands. It is a good protective in erysipelas and other acute skin affections.

XANTHIUM.—Clotbur.

Pharmacology.—The whole plant of Xanthium strumarium (Compositæ), growing widely in Europe and America, possesses medicinal virtue. A fluid extract is given in the dose of 1 to 2 fluidrachms.

Therapy.—Xanthium, according to Dr. John W. Eckfeldt, is a decided alterative and hæmostatic, and is useful in various forms of hæmorrhage. In metrorrhagia, post-partum bleeding, and hæmorrhages occurring during the climacteric period this remedy is of value. Clotbur is serviceable, likewise, in bleeding piles and in dysentery. In strumous enlargement of lymphatic glands and in skin diseases of a scaly form it is reported to be beneficial.

XANTHOXYLUM (U. S. P.).—Prickly Ash.

Dose, gr. x–xxx.

Preparation.

Extractum Xanthoxyli Fluidum (U. S. P.).—Fluid Extract of Prickly Ash. *Dose,* f℥ss-j.

Pharmacology.—The bark of Xanthoxylum fraxineum and of Xanthoxylum Carolinianum (Rutaceæ) contains a bitter principle, **Xanthoxyline,** which is an alkaloid, probably identical with **berberine.** It also contains a volatile oil, resin, gum, a fixed oil, etc.

Physiological Action.—Prickly-ash bark is an aromatic bitter; it is also diaphoretic, diuretic, and sialagogue. It causes augmented secretions along the intestinal tract, including the liver, and has emmenagogue properties. It is also considered alterative. Xanthoxyline increases the action of the heart and raises arterial tension.

Therapy.—Xanthoxylum is used in a variety of disorders, from toothache to jaundice. It is an ingredient in the compound syrup of

clover (see Trifolium), which is used in the treatment of syphilis and scrofula; also in chronic and muscular rheumatism and skin disorders. Prickly ash is a very effective tonic to the mucous membrane of the gastro-intestinal canal. It assists glandular action and can be employed for the treatment of many diseases in which the glands of the skin or mucous membranes are affected. The following combination will be serviceable :—

℞ Tinct. xanthoxyli, ... f℥iv.
Tinct. nucis vomicæ, ... ♏cc.
Tinct. cardamomi, ... q. s. ad f℥v.

M. Sig.: Two teaspoonfuls in water three times a day. A suitable tonic, useful in atonic dyspepsia, acne, and seborrhœa.

In functional dysmenorrhœa, or suppression of the menses, prickly ash is successful, in doses of 30 minims of the fluid extract, which is a strong tincture. In pharyngitis and post-nasal catarrh, a decoction may be used as a wash or gargle, and the fluid extract administered internally. In liver disorders, combined with cascara and other drugs, it is often very decided in its effects.

Xanthoxyli fructus, or prickly-ash berries, contain volatile oil and a resin, and are antiseptic. They are used in fluid extract or decoction, in affections of mucous membranes, especially diarrhœa, cholera morbus flatulence, colic, etc. The fluid extract is alcoholic, and doubtless the menstruum aids in the effect. Prickly ash is useful in constipation due to deficiency of the intestinal secretions.

ZEA MAYDIS OLEUM.—Oil of Zea Mays.

Pharmacology.—The stigmata of Zea Mays, and the fungus or Ustilago, have already been considered. The fruit or seed, commonly known in this country as corn, contains a considerable quantity of a bland, yellow, fixed oil, which adds to its value as food and might be utilized in pharmacy in making ointment.* (See also pages 735 and 736.)

ZINCUM (U. S. P.).—Zinc.

Salts and Preparations.

Zinci Oxidum (U. S. P.).—Oxide of Zinc. *Dose*, gr. ¼–v.
Zinci Bromidum (U. S. P.).—Bromide of Zinc. *Dose*, gr. i–v.
Zinci Chloridum (U. S. P.).—Chloride of Zinc. For external use.
Zinci Acetas (U. S. P.).—Acetate of Zinc. *Dose*, gr. ss–ij, or as an emetic, gr. x–xxx
Zinci Carbonas Precipitatus (U. S. P.).—Precipitated Carbonate of Zinc. *Dose*, gr. ii–iij.
Zinci Iodidum (U. S. P.).—Iodide of Zinc. *Dose*, gr. ss–ij.
Zinci Phosphidum (U. S. P.).—Phosphide of Zinc. *Dose*, gr. $\frac{1}{20}$–¼.
Zinci Sulphas (U. S. P.).—Sulphate of Zinc. *Dose*, gr. i–xx.
Zinci Valerianas (U. S. P.).—Valerianate of Zinc. *Dose*, gr. i–ij.
Zinci Lactas.—Lactate of Zinc. *Dose*, gr. ss–j.

* An interesting article on "Oil of Indian Corn," by Dr. Charles O. Curtman, appeared in the Drugman, July 25, 1886.

Unguentum Zinci Oxidi (U. S. P.).—Ointment of Zinc Oxide (20 per cent.).
Liquor Zinci Chloridi (U. S. P.).—Solution of Zinc Chloride (50 per cent.).
Zinci Sulpho-Carbolas.—Sulpho-Carbolate of Zinc. *Dose*, gr. ii–iij.
Zinci Cyanidum.—Cyanide of Zinc. *Dose*, gr. ¼–iss.
Oleatum Zinci.—Oleate of Zinc (5 per cent.).
Unguentum Zinci Carbonatis.—Ointment of Zinc Carbonate (20 per cent.).
Unguentum Zinci Carbonatis Impurum.—Calamine Ointment (made with native carbonate of zinc).

Pharmacology.—Zincum is metallic zinc, in the form of sheets or of irregular, granulated pieces. It is a silvery metal when polished, but soon tarnishes, and, when exposed to the air, forms oxide or carbonate. The zinc salts are white, and are usually soluble in water, but the oxide, carbonate, phosphide, and cyanide are insoluble. The soluble salts are usually poisonous, and zinc cannot be used for cooking utensils on this account.

Physiological Action.—Most of the salts of zinc are astringents, but some are corrosive poisons; among the latter are the chloride, acetate, sulphate, iodide, and cyanide. They produce pain, nausea, vomiting with great retching, and sometimes catharsis and muscular depression. Continued use of zinc salts causes symptoms of disorder of the nerve-centres resembling those of lead poisoning, showing less tendency to accumulate in the system than some other metals; but elimination, as in other cases, takes place through the action of the liver and intestinal glands. In cases of poisoning, the object of treatment would be to favor evacuation and to relieve symptoms. It is best to give flour and water, or milk, or soapy water; the alkaline bicarbonates, especially soda, are the chemical antidotes. The hypodermatic injection of morphine may be required to relieve vomiting. Subsequently, the use of iodide of potassium, warm baths, and laxatives will remove the metal compounds from the tissues.

Therapy.—In weak solutions, the zinc salts may be employed as astringents. The acetate (gr. ss–j) in rose-water (f℥j) is useful as a collyrium in conjunctivitis; it is beneficial, also, as an injection in gonorrhœa and gleet. :—

℞ Zinci sulph., ... gr. v.
Bismuth. subnit., ... ʒiss.
Glycerini, ... f℥ss.
Aquæ cinnamomi, ... q. s. ad f℥v.

M. For injection in gonorrhœa after the acute stage has passed.

℞ Zinci sulph., ... gr. vj.
Tinct. opii deod.,
Tinct. catechu, ... āā f℥ss.
Aquæ rosæ, ... f℥ij.

M. Sig.: For injection in chronic gonorrhœa or gleet.

The sulphate is likewise used as a collyrium (gr. ii–iv to ℥j), especially when conjunctivitis tends to become chronic, and is beneficial in inflammations of the skin. In acne, Dr. Fred. J. Leviseur * uses in conjunction with hot-water applications :—

℞ Zinci sulphatis,
Potassii sulphitis, ... āā ʒj.
Aquæ rosæ, ... f℥iv.
Dissolve each ingredient separately in 2 ounces of the rose-water, mix and add
Resorcini, ... ʒj.
Sig.: Lotion ; shake well. This is to be used hot at night and cold in the morning.

The ointment of the oxide of zinc is largely used as a protective and slightly astringent application to acute skin affections, and to an ounce or more can be added carbolic acid, ʒss ; oil of cade, ʒj ; tar, ʒss–j, and other agents, according to the case, for treatment of eczema, herpes, erysipelas, and burns. The chloride is a powerful caustic and antiseptic. In dilute solution (gr. i–ij to ℥viij), it is useful as an injection in gonorrhœa or leucorrhœa; in stronger solutions, or mixed into a paste with flour and water, it can be applied to lupus or malignant growths, or be used for creating sloughs.

The chloride of zinc, in the form of a paste, made with starch, or 4 parts of the chloride of zinc, farina 3 parts, and oxide of zinc 1 part, as used by Vohwinkel, is often a very effective application to morbid growths. Haberlin (*Correspondenzblatt für Schweizer Aerzte*), in inoperable uterine carcinoma, employs a paste of chloride of zinc, which he regards as a good palliative treatment. The elder Penrose, of Philadelphia, has likewise applied the chloride of zinc in the form of a saturated solution by means of a tampon in malignant disease of the uterus with decidedly good effect. This salt may also be employed for the purpose of destroying epitheliomata, nævi, enlarged glands, warts, and condylomata. The liquor is a strong preparation, and, greatly diluted (ʒj–Oj), it is a detergent and stimulating application to old ulcers, and has likewise been employed as a disinfectant for wounds.

The iodide of zinc is only used in ointment for enlarged glands (ʒj–℥j of simple ointment), or in solution as an application to enlarged tonsils. The oxide, when in a smooth, dry powder, is useful as a dusting-powder for infants, but the carbonate is better for this purpose. Oleate of zinc has been already considered (page 384). W. D. Haslam states that a mixture of equal parts of iodoform and oleate of zinc is of great value in gynæcology, applied by insufflation or on a tampon.

The application of solutions of zinc, especially of the chloride, is

* Med. Record, September 13, 1890.

not without danger. It has been the practice of some gynæcologists to apply chloride of zinc to the inner surface of the uterus in the treatment of metritis. Dr. Poggi warns against its use in young women and in acute inflammation, on account of the risk of producing atresia and obliteration of the uterine cavity, or setting up tubal inflammation. Doléris * prefers curetting to the application of caustics, which also receives the sanction of Goodell. Aseptic curetting is commonly safe, and causes no such ill effects, even in complicated cases.

The sulphate of zinc is a decided astringent, and in doses of gr. x–xx is a prompt emetic. It has been used for the latter purpose in narcotic poisoning, croup, and for promptly evacuating the stomach. It is a systemic emetic, and causes vomiting when injected into the blood. As an astringent, it has been administered in combination with opium or Dover's powder, in diarrhœa, and chronic dysentery. In small doses, it has been employed as an antispasmodic in asthma, chorea, epilepsy, angina pectoris, hysteria, etc. The stomach becomes remarkably tolerant of the sulphate, so that as much as 40 grains have been given, thrice daily, without exciting sickness of the stomach. Such massive doses, however, should not be long continued, as they eventually occasion superficial ulceration of the stomach. The sulphate of zinc is also frequently employed internally for the relief of bronchorrhœa.

In the treatment of chorea the sulphate of zinc is used, beginning with 1-grain doses three times daily and gradually increasing them until the limit of tolerance is reached. The sulpho-carbolate of zinc is an antiseptic and astringent. Dr. W. F. Waugh has used this salt for several years in cholera infantum (see page 371) and typhoid fever, and all cases in which the occurrence of fetid stools, with tympanites, etc., indicate the need of intestinal antisepsis. In cholera infantum he has treated numerous cases for three seasons, with no deaths. In typhoid fever, he has treated upward of 70 cases, with no death in any case where this salt was employed from the beginning. The dose is gr. ss to gr. j for children, gr. iiss to gr. v for adults, to be given every two hours until the stools are odorless, and thereafter in doses sufficient to keep the stools in this condition. The effects are a reduction of the fever, tympanites, diarrhœa, and delirium; the attack is shortened and rendered less dangerous. When the symptoms of cholera infantum assume the dysenteric form, the zinc is given in enemas, 10 grains to 2 ounces of warm water. The cyanide of zinc is used in Germany as a substitute for hydrocyanic acid; the dose is gr. ¼ gradually increased to gr. iss, given in a mixture. It has also been employed in epilepsy, chorea, and in neuralgia, in painful affections of the stomach, and dysmenorrhœa.

* Provincial Medical Journal, December 1, 1890.

In many nervous affections, the valerianate of zinc has special advantages of other salts in neuralgia, nervous headache, nervous cough, ovaralgia, chorea, epilepsy, etc; if given in small doses, repeated at short intervals, it is beneficial. The night-sweating of phthisis is sometimes checked by the oxide of zinc, given in pill form (gr. iij at night); the oxide may also be given in the summer diarrhœa of infants or adults. In chorea the same salt is of much value alone, or combined as follows:—

℞ Zinci oxidi, ... gr. v.
Ferri pyrophos., ... gr. xl.
M. et ft. pil. no. xx.
Sig.: Two or three pills a day.

The oxide of zinc is serviceable in gastralgia, and has sometimes proved useful in epilepsy. Bartholow believes that it is most successful when epilepsy is the result of peripheral irritation, having its origin in the stomach. The same writer esteems the oxide as of prophylactic value in spasmodic asthma. Whooping-cough and chronic alcoholism have their symptoms relieved by the oxide.

ZINGIBER (U. S. P.).—**Ginger.**

Dose, gr. x–xv.

Preparations.

Extractum Zingiberis Fluidum (U. S. P.).—Fluid Extract of Ginger. *Dose*, ♏︎i–xx.

Oleoresina Zingiberis (U. S. P.).—Oleoresin of Ginger. *Dose*, ♏︎ss–ij.

Syrupus Zingiberis (U. S. P.).—Syrup of Ginger (2 per cent.). *Dose*, f℥i–iv.

Tinctura Zingiberis (U. S. P.).—Tincture of Ginger (20 per cent.). *Dose*, ♏︎x–fℨj.

Trochisci Zingiberis (U. S. P.).—Troches of Ginger (each lozenge contains ♏︎ij of the tincture). *Dose*, one to three troches.

It also enters into aromatic powder (page 555), compound rhubarb-powder (page 861), and wine of aloes (page 424).

Pharmacology.—Ginger is the rhizome of Zingiber officinale (Zingiberaceæ), cultivated in tropical countries as a spice. Green ginger is put up in syrup or candied, and used as a digestive confection at the dinner-table as a corrective of flatulence. It comes from different sources, but the Jamaica ginger is preferred for culinary purposes, having the best flavor. Ginger contains a volatile oil, to which the flavor is due, and a pungent resin.

Physiological Action.—It is an agreeable carminative and stimulant, increasing the secretions and promoting peristalsis. It increases slightly the amount of urine, and acts as an irritant to the bladder and urethra. Externally it is rubefacient.

Therapy.—Ginger is added to purgative pills to prevent griping, and to salines in order to disguise their taste. It is useful in atonic dyspepsia, especially in elderly persons, and is of service in flatulence and diarrhœa. The syrup is commonly used as a vehicle for stomachic preparations and tonics.

APPENDIX.*

ACIDUM SULPHORICINICUM.—Sulphoricinic Acid.

Pharmacology.—This derivative of castor-oil is but slightly irritant to the skin, though rapidly fatal to animals when injected into the veins, pleura, or peritoneum. The sulphoricinate of sodium is made by exactly neutralizing sulphoricinic acid with soda.

Physiological Action.—The salt adheres well to the skin, is antiseptic and deodorizing. Berlioz found a 10-per-cent. solution entirely destroyed the odor of five or six times its weight of very fetid pus.

Therapy.—The sodium salt has been used as a topical remedy in ozæna, diphtheria, and laryngeal tuberculosis. Several antiseptic compounds have been prepared with the sulphoricinate of sodium. Sulphoricinated naphthol forms an emulsion which has been used in ozæna. Sulphoricinated creasote is used pure or made into an emulsion with water in laryngeal tuberculosis. Sulphoricinated salol has been employed either in its own form, or diluted, as an application to ulcers. Sulphoricinated phenol is made by dissolving with a little heat 40 grammes of pure carbolic acid with 100 grammes of sulphoricinate of sodium. A solution of one-fourth of this strength is now being used in some of the hospitals of Paris in diphtheria. The mixture adheres well to the surface and does not irritate or cause pain. It is applied upon pledgets of cotton and is not washed off by gargles or irrigations. A combination of 10 parts of salol, 2 parts of creasote or terpene hydrate, and 80 parts of sulphoricinate of sodium is also serviceable in diphtheria.

ALUMNOL.

Pharmacology.—This is the name given to a substance discovered by Filehne, of Breslau. It consists of a mixture of aluminium salts of naphthol-sulphonic acid, and contains 5 per cent. of aluminium and 15 per cent. of sulphur. Alumnol occurs in the form of a fine white or light pink-colored powder, free from odor, not hydroscopic, readily soluble in water, soluble in glycerin, less so in alcohol, and insoluble in ether. Alumnol precipitates albumin and gelatin, but is redissolved in excess of those substances. It possesses marked penetrative action. It strikes a blue color with solutions of ferric chloride. Alumnol darkens upon exposure to the air, without losing its properties.

* On account of changes made in preparing a second edition, it was found necessary to describe a number of remedies in an Appendix at the end of the work.

Physiological Action.—This substance is antiseptic, astringent, and, in concentrated form, cauterant.

Therapy.—It may be used as a lotion, ointment, or plaster. Alumnol is a serviceable application to ulcers, wounds, and abscesses. For the irrigation of abscess-cavities it may be used in a 10- to 20-per-cent. solution. A 1-per-cent. solution is beneficial as an injection in gonorrhœa, and in endometritis due to gonorrhœa sticks containing from 2 to 5 per cent. may be employed with advantage. M. Chotzen has reported his experience with this remedy in more than three hundred cases. He describes it as a beneficial application to chancres and chancroids, balanitis, and erosions. Solutions containing from 1 to 5 per cent. are of value in moist and papular eczema, acne, and furunculosis. An alcoholic solution of 2.5 to 10 per cent. is effective in urticaria, sycosis, and psoriasis. Incorporated with lanolin, in the strength of 2.5, 5, 10, and 20 per cent., it is successful in eczema, seborrhœa capitis, psoriasis, and favus. In erysipelas and lupus alumnol is also employed with good results. A 4-per-cent. solution dropped into the eye arrests the flow of tears for several minutes,—a property which will, in certain instances, materially facilitate examination.

ANIMAL SECRETIONS, EXTRACTS, AND JUICES.

Pharmacology.—Various secretions, juices, or tissues have been recently made use of in therapeutics. The extract obtained from the testicle by M. Brown-Séquard, and employed by him and others for the relief of organic and functional nervous disorders and certain constitutional diseases, has been described in the body of this book (pages 914 and 915). The virtue of testicular fluid has been shown to depend upon the presence of spermine,—a substance which is also contained in other glands, especially the pancreas.

Physiological Action.—The injection into the human body of extracts obtained from animal tissues may prove of service by modifying the constitution of the blood, or by supplying to it elements of which it stands in need. It is conceivable that when the functions of certain organs, especially those concerned in nutrition and sanguification, are suppressed, the introduction of the corresponding tissues, secretions, or extracts derived from healthy animals may prove beneficial. Acting upon this theory, preparations representing muscular, nervous, renal, and thyroid substance have been employed in practical therapeutics.

Therapy.—A glycerin extract of gray matter of sheep's brain has been used by M. Constantin Paul with encouraging results in neurasthenia and locomotor ataxia. Dr. William A. Hammond is convinced of the value of an extract, which he terms cerebrine, prepared from the whole brain of the ox. The finely-minced brain is macerated for six

months in distilled water containing boric acid, pure glycerin, and absolute alcohol. It is then allowed to percolate slowly through a stone filter, the most rigid antiseptic precautions being taken during the whole process. Dr. Hammond states that cerebrine renders the pulse more rapid and full, creates mental exhilaration, promotes the secretion of urine, increases muscular strength, stimulates the muscular coat of the bowels and bladder, and benefits appetite and digestion. The quantity injected at a sitting is 5 minims, diluted with an equal quantity of distilled water. Good results have been obtained in neurasthenia, migraine, hysteria, and in some cases of epilepsy. Preparations of cardiac tissue have been injected for the relief of asystole. Nephrine, a saline glycerin extract of the cortical substance of the kidney, has been proposed as a remedy in cases of nephritis. Subcutaneous injections of nephrine will, it is thought, prove of service in the treatment of uræmia. The serum of the blood of the lamb and the ox have been injected into syphilitic subjects, in a number of cases, by Italian clinicians, and the symptoms of the malady have undergone decided improvement. The quantity employed was about 1½ fluidrachms, thrown, upon alternate occasions, into the subcutaneous tissue of each buttock. No other medication was used in these experimental cases. The subject deserves continued investigation. It is possible that the blood of animals insusceptible to syphilis may have an antagonistic action to the virus of that disease.

The most decided results from this method of therapy have been obtained in the treatment of myxœdema.* This disease depends upon abolition of the functions of the thyroid gland. It has been amply demonstrated that grafting of a healthy thyroid upon the body of the patient or the injection of an extract made from the gland is followed by remarkable and rapid amelioration. The quantity of the extract thrown in is 25 minims, and the operation is repeated once or twice a week, according to the severity of the case and the rate of improvement. At the end of a month or six weeks the condition has generally been so signally benefited that the procedure can be practiced at longer intervals. The extract is prepared by mincing the gland, freshly taken from a healthy animal, maceration, and filtration under pressure. The preparation and injection should be made with every antiseptic precaution. The numerous cases, in all stages, which have been reported, leave no room for doubt that in this method we have acquired an effective weapon against a disease which had been unamenable to any other method of treatment. It is probable, also, from the reports which have been made of some cases, that administration of the thyroid gland itself as a food is remedial.†

* See Report of London Clinical Society, Lancet, February 4, 1893; also the British Medical Journal, February 4, 1893.

† See editorial in Medical Bulletin for March, 1893.

APOCYNUM (U. S. P.).—**Apocynum,** or **Canadian Hemp.**

Dose, gr. v–xx.

Pharmacology and Therapy.—The root of Apocynum Cannabinum (Apocynaceæ), a plant belonging to this country, contains **Apocynin** and **Apocynein,** the former soluble in alcohol, the latter in water. These principles in small doses act upon the circulation as a tonic, like strophanthus. In larger amounts they are emetic, cathartic, and diuretic. A decoction has been used in the dose of f℥i–ij in the treatment of dropsy.

ARECA.—**Areca,** or **Betel-Nut.**

Dose, ♏v–xx (or ʒi–ij), as a vermifuge.

Pharmacology and Therapy.—The seed of Areca catechu (Palmaceæ) contains an oil and an acid constituent in addition to tannic acid. The powder has for a long time been used as a tæniacide in veterinary practice. The fluid extract is the best preparation. Its administration should be preceded and followed by a purgative like castor-oil. Betel-nut is believed also to increase the secretions from the salivary glands, and has a slightly stimulating effect upon the cerebral centres.

AVENA.—**Oat.**

Pharmacology and Therapy.—The fruit of Avena sativa (Gramineæ) is used as a food in the form of meal, of which cakes, gruel, or porridge is made. It is a highly nutritious food, containing oil, nitrogenized principles, carbohydrates, phosphates, etc., but on account of its concentrated form and the presence of irritating fragments of the outer coat, containing silica, oatmeal is likely to cause indigestion, and in young children diarrhœa. The habit of eating porridge with milk and large quantities of sugar is apt to cause sour stomach and pyrosis, which may be avoided by using butter or cream and salt instead of the milk and sugar. Skin eruptions have been attributed to the use of oatmeal, particularly eczema, in infants, which is cured by a change of diet. An alcoholic tincture of oats has been supposed to have a sedative action upon the cerebral centres and to remove the craving for drink. For the latter, it would be more rational to recommend an infusion than a tincture

BENZANILIDE.

Dose, gr. v–xv.

Pharmacology.—Benzanilide is a white powder, which melts at 321.8° F., is insoluble in water, soluble in alcohol and, with difficulty, in ether. In chemical composition it is closely allied to acetanilide. It is without odor and has a slightly caustic taste. It is given in single doses of 15 grains, and from 1 to 1½ drachms may be administered in the twenty-four hours. Though at first well borne in these amounts, intolerance is generally manifested after several days' use.

Physiological Action.—Benzanilide depresses febrile temperature. Its effects are manifested from half to one hour after exhibition; the maximum is reached in four or five hours; the temperature then begins to ascend, and reaches its original height in ten to twelve hours. Respiration is not usually affected, though occasionally it is hastened. The pulse is rendered more slow and soft. Benzanilide produces no alteration in the quantity or reaction of the urine, but communicates to that fluid a greenish or even blackish color.

Therapy.—The activity of benzanilide seems to be limited to the reduction of temperature, having no influence upon the course of the disease. It has been given in typhoid fever, rheumatism, pneumonia, in neuritis, sciatica, malaria, etc.

BENZO-NAPHTHOL.

Dose, gr. v–ʒj.

Pharmacology.—MM. Yvon and Berlioz have prepared a combination of benzoic acid and beta-naphthol, to which they have given the name of beta-naphthol, or benzo-naphthol. This body belongs to the same aromatic series as its components. It occurs in the form of a whitish, crystalline powder, devoid of taste and odor, almost completely soluble in water at ordinary temperatures, but dissolving by the aid of heat. It is slightly soluble in ether, but readily soluble in chloroform.

Physiological Action.—Benzo-naphthol is easily changed in the presence of alkalies, especially under the influence of heat. In the alimentary canal it is decomposed into beta-naphthol, which remains within the bowel, and benzoic acid, which is eliminated in the urine, after having combined with alkaline bases. Benzo-naphthol can be given to guinea-pigs in considerable doses before any toxic results occur. According to Dominici, it reduces temperature and cardiac and respiratory action. Its antiseptic power is comparable to that of other substances used for disinfecting the alimentary canal.

Therapy.—Benzo-naphthol may be administered in the daily dose of 75 grains to the adult, or 30 grains to children, but is preferably given in small quantities, often repeated, in a cachet or suspended in a syrup. It is an excellent intestinal antiseptic, and has a pronounced diuretic action.

BENZOSOL.—This substance has been proposed as a substitute for creasote or guaiacol. It is decomposed within the organism, forming benzoic acid and guaiacol, and is eliminated by the urine and saliva. The dose is 4 grains, three times a day, and may be gradually increased to 15 grains. Benzosol may be given, with chocolate and sugar, in the same diseases in which creasote and guaiacol are indicated.

BOLDUS.—Boldo.

Pharmacology and Physiological Action.—The Peumus boldus (Monimiaceæ) is an evergreen belonging to the western coast of South America. The leaves and small stems contain a bitter extractive, a volatile oil, and a bitter alkaloid (or glucoside?), **Boldoin.** A tincture (5 per cent.) is used in 5-minim doses or more, gradually increasing, and produces vomiting and purging in full doses, and also a sedative or narcotic effect upon the brain. In small doses it is carminative and stimulant to the stomach.

Therapy.—In South America this plant has some reputation for its influence upon genito-urinary disorders, gonorrhœa, gleet, cystitis, and catarrhal inflammations of the kidneys. It has also been used for rheumatism, and as a tonic in dyspepsia and general debility. In cirrhosis, it is especially recommended by Campenon. Boldoin, the active principle, has hypnotic powers, and has been successfully tried in France as a substitute for opium or chloral (Juranville).

BRYONIA (U. S. P.).—**Bryonia.**

Preparations.

Tinctura Bryoniæ (U. S. P.).—Tincture of Bryonia. *Dose*, f℥i–iv.
Extractum Bryoniæ Fluidum.—Fluid Extract of Bryonia. *Dose*, ♏v–xv.
Bryonin.—The active principle. *Dose*, gr. ⅙–⅓.

Pharmacology.—Bryonia alba and Bryonia dioica (Cucurbitaceæ) are the officinal sources of the root known as Bryonia, which must be recently dried, as an old drug is useless; the green root is preferred by some as being most active. **Bryonin,** a glucoside, is the principal constituent; it appears in pearly crystals or in white powder; it is very bitter; soluble in water and alcohol.

Physiological Action.—The juice of the fresh plant blisters the skin. The drug, taken internally, acts as an irritant, and is a drastic purgative. It also increases the flow of urine.

Therapy.—As there are better purgatives, bryonia is not required for this purpose. It is used, in small doses, in rheumatism, pleurisy, and other serious inflammations, after the fever has abated. It appears to be especially serviceable in the muscular pains and stiffness following colds. In chronic bronchitis it has been advocated; and, also, by Petresco, in cases of hæmorrhage, especially in epistaxis.

BURSA PASTORIS.

Pharmacology and Therapy.—Shepherd's Purse is a small plant belonging to the Cruciferæ, a native of Europe. It contains a volatile oil, resembling oil of mustard, a glucoside, bitter principle, resin, etc. Of the tincture, made with fresh leaves, the dose is ♏x–f℥j to f℥iv, given in cases of hæmorrhage from the lungs, kidneys, or uterus, and also in diarrhœa and dysentery.

CEDRON.—Cedron-Seed.

Dose, gr. i–ij.

Pharmacology.—The Simaba cedron (Simarubaceæ) of the United States of Columbia contains two alkaloidal substances, **Cedrine** and **Cedronine.** The seeds have a bitter taste.

Therapy.—Cedron-seed has a reputation in South America for curing malarial affections, and is largely used in derangements of the digestive organs, diarrhœa, cholera morbus, etc. It is also claimed to have decided influence over the course of hydrophobia, and is said to be of value in treating poisoned wounds, bites of venomous snakes, insects, etc. The remedy is used both topically and internally, the usual dose being 1 or 2 grains; but Dr. Purple gave it in doses of 20 or 30 grains every four hours in intermittent fever with satisfactory results.

CHLORALOSE.—Anhydro-gluco-chloral ($C_8H_{11}Cl_3O_6$).

Dose, gr. iii–vj.

Pharmacology.—Chloralose is produced by the action of anhydrous chloral on glucose. It crystallizes in fine needles, is very bitter to the taste, readily soluble in hot water, but dissolves with difficulty in cold water.

Physiological Action.—According to the experiments of Prof. Ch. Richet and Dr. Hanriot, chloralose has a marked hypnotic effect upon dogs when given in small doses. In large quantities it is toxic. Chloralose stimulates the spinal cord. Reflex action is not diminished, but may even be exaggerated.

Therapy.—From 3 to 6 grains occasioned a dreamless and refreshing sleep, which was not followed by nausea or headache. It was administered advantageously in some cases where chloral and morphine had been badly borne.

CORONILLA.

Dose, gr. v–xx.

Coronillin, gr. i–ix.

Pharmacology.—Coronilla varia (Leguminosæ) is a shrubby plant, the flowers of which are arranged in little tufts resembling coronets. The active principle is a glucoside, which has been termed coronillin.

Physiological Action.—The drug possesses an unpleasant, bitter taste, but it increases the appetite and never excites gastro-intestinal disorders even when given in large doses. Coronilla is a cardiac tonic.

Therapy.—In organic affections of the heart coronilla increases the volume of the pulse, augments diuresis, diminishes œdema, and relieves dyspnœa. It regulates and reduces the action of the heart in tachycardia and abolishes painful reflex manifestations. In lesions of the mitral

and aortic valves it is especially beneficial. The paroxysms of dyspnœa dependent upon organic disease of the heart are mitigated by this remedy. A tincture has been used in doses of ½ to 1 fluidrachm.

ECHINACEA.

Preparation.

Tinctura Echinaceæ. Dose, ♏x–f℥j.

Pharmacology and Therapy.—Echinacea augustifolia, a plant growing in our Western States, is said to possess active therapeutic properties, especially as an antiseptic. A tincture made by macerating 1 pound of the root in 1 pint of alcohol has been used, diluted with water, as a local application to chronic ulcers, abscess-cavities, and wounds. Internally, in doses of 10 drops, it is recommended in cholera infantum and cholera morbus. It is also reported to be useful in typhoid fever, malarial fevers, measles, small-pox, erysipelas, diphtheria, boils, and carbuncles. The tincture has been used with asserted success in the case of several individuals who had been bitten by rabid dogs. In some cases it seemed to be prophylactic, while in others it favorably modified the symptoms. It is said to be an antidote to bites or stings of venomous insects or reptiles.

EUCALYPTEOL.

Dose, gr. ss–iij.

Pharmacology and Physiological Action.—Eucalypteol, or bichlorhydrate of eucalyptene, is a crystallized product derived from the essence of eucalyptus. According to the report of Dr. Lafarge, eucalypteol is well borne by the stomach, is innocuous, and is decomposed in the intestine into hydrochloric acid and eucalyptol, the latter of which is, in part, absorbed.

Therapy.—Eucalypteol exerts a decided antiseptic action upon the bowel. It is appropriate to the treatment not only of diseases of the respiratory passages, but also to those involving the intestine, such as enteritis, diarrhœa, typhoid fever, fetid diarrhœa, the green diarrhœa of infants, etc.

EUPHORIN.—Phenylurethane.

Dose, gr. iii–vj.

Pharmacology.—This compound, introduced by Professor Giacosa, of Turin, is an aniline product, occurring in the form of a white crystalline powder, sparingly soluble in cold water. It possesses a faint, aromatic odor, and a taste which, at first feeble, becomes warm and pungent.

Physiological Action.—Euphorin is antiseptic, antipyretic, and analgesic. It diminishes suppuration and reduces abnormal temperature by

causing dilatation of peripheral blood-vessels. It likewise promotes diaphoresis. Euphorin is thought to increase the excretion of urea. When given by the mouth, it is not followed by the appearance of phenol, aniline, albumin, or sugar in the urine. Euphorin is said to occasion no unpleasant after-effects.

Therapy.—Euphorin in powder has been used with advantage upon ulcerated surfaces, and has been found capable of stimulating repair in chronic lesions. Peroni and Bovera report favorably of its efficacy as a local agent in various cutaneous manifestations of syphilis, having employed it in ninety-one cases. They applied the drug in the form of powder, ointment, and soap. Dr. Sansoni regards it as of service in chronic ophthalmia. Professor Stiller, of Pesth, administered euphorin in different forms of neuralgia, including hemicrania and sciatica, and, in most cases, observed relief of pain. He also found it beneficial in cases of chronic articular and muscular rheumatism, and rheumatic fever.

EUROPHEN.—Isobutyl-ortho-cresol Iodide.

Dose, gr. v–x.

Pharmacology.—Europhen is the product of the action of iodine upon isobutylorthocresol in a solution of iodide of potassium. It occurs in the form of a fine, soft, amorphous powder, of a light-yellow color, without taste, and having a faint, not unpleasant odor. The odor almost entirely disappears when the substance is made into a mixture or solution. Europhen is insoluble in water or glycerin, but dissolves in alcohol, ether, chloroform, and fixed oils. The specific gravity of europhen is half that of iodol and one-fifth that of iodoform. Europhen is easily decomposed by light and heat, and should be kept in a dark, dry, and cool place, and its solutions be made at a low temperature. The average proportion of iodine contained in europhen is 27.6 per cent. Its solutions, upon standing, throw down a precipitate, consisting of an organic iodine compound, soluble in water. Europhen contains a very small percentage of free iodine. It is incompatible with starch, metallic oxides, and the salts of mercury.

Physiological Action.—Europhen adheres firmly to the skin, mucous membrane, and open surfaces. When taken into the system it undergoes little change. A very small proportion of iodine is found in the urine, and the greater portion passes through the intestinal canal unchanged. Europhen is non-toxic, but by a chemical action prevents the development of pathogenetic micro-organisms in culture media.

Therapy.—Europhen, in the form of a powder or 10-per-cent. ointment, is an excellent dressing to ulcers of various kinds. Leg-ulcers often heal rapidly under its influence. It forms a valuable application

to wounds, chancroids, open buboes, ulcerated chancres, condylomata, and ulcerated lesions of secondary and tertiary syphilis. Dr. P. J. Eichhoff used it with advantage in scrofuloderma, lupus vulgaris, and deep burns, but found it of no avail in favus or gonorrhœa. The author has used* this substance with success in the treatment of incised, contused, and lacerated wounds. In chronic ulcers of the leg and scrofulodermata, also, it exerted a beneficial influence and led to rapid cicatrization of the lesions. A lupous ulcer was decidedly improved by the application of europhen, and eventually healed. In one case of superficial epithelioma, an ointment containing 3 or 4 drachms of europhen to the ounce effected a cure. In a second case, after europhen first, and subsequently aristol, had been used without much result, a mixture of equal parts of europhen and aristol, made into an ointment, was applied with entire success. A 10-per-cent. ointment of europhen was efficient in sycosis, and the powder, dusted upon the surface of a carbuncle after the necrotic tissue had been removed, promoted the healing of the wound. Papular acne was cured by the application of an ointment containing from 1 to 2 drachms to the ounce of base. In the second stage of rosacea, a marked improvement followed the use of an alcoholic solution of europhen. The papules and pustules, together with the roughness of the skin, disappeared, and the capillary injection was diminished. An ointment was advantageous in erysipelas and in the dermatitis caused by poisoning by rhus toxicodendron. Applied as a dusting-powder, europhen proved beneficial in herpes progenitalis, herpes zoster and seborrhœa oleosa, hyperidrosis and bromidrosis. An ointment was of assistance in the treatment of alopecia circumscripta. The powder was of value in several cases of acute vesicular eczema, while the ointment rendered good service in some severe cases of chronic eczema. The writer obtained a good result in one case of psoriasis from the use of an ointment containing the equal mixture of europhen and aristol. Eichhoff observed a case of psoriasis in which europhen was inferior in its action to aristol or tar. In syphilitic ulcers the experience of the writer is confirmatory of that of Eichhoff. Dr. Seifert, of Würzburg, saw benefit in gonorrhœa of the female from the use of tampons impregnated with europhen. The same mode of treatment was effectual in endometritis with profuse discharge. Dr. Petersen, of Würzburg, reports satisfactory results from the insufflation of europhen in the rhinitis of scrofulous children, attended with profuse discharge and eczema of the nares. A 10-per-cent. ointment of europhen was, in the clinic of Dr. Seifert, extremely efficacious in the treatment of both the simple and the fetid forms of atrophic

* Europhen: with Clinical Reference to Europhen and Europhen-Aristol. By John V. Shoemaker, A.M., M.D. See Medical Bulletin, September, 1892.

rhinitis. The preparation was introduced upon cotton tampons, which were left in place for about half an hour. Secretion was promoted, crusts and obnoxious odor disappeared. From the clinic of Professor Jurasz, of Heidelberg, Dr. von Szoldrski reports a favorable influence in three cases of laryngeal tuberculosis with abundant secretion. He esteems europhen of value after operations upon the nose or larynx. Dr. Löwenstein has obtained good results with europhen in perforating ulcer of the nasal septum, and in epistaxis dependent upon erosion of the septum. Dr. Nolda employed europhen successfully in three cases of suppurative inflammation of the middle ear. Dr. Nulpius reports, from the clinic of Professor Czerney, in Heidelberg, that europhen was beneficial in the treatment of wounds, osteomyelitis, and tubercular ulcers. Dr. Fermandez recommends europhen in cases of accidental or operative traumatisms of the eye, in conjunctivitis and keratitis. He generally employs a 1-per-cent. ointment. Europhen powder forms a convenient dressing, on account of its adhesive qualities and the fact that it does not harden into a compact cake upon the surface to which it is applied. Europhen has, as yet, been used but little as an internal medicament. Eichhoff has experimented with it hypodermically in the treatment of syphilis, but it is at this time premature to formulate conclusions upon its use in this manner.

FLUORESCEIN.

Pharmacology.—This is the name given to a body which results from heating together resorcin and phthalic anhydride. It is of acid reaction, and when freshly precipitated readily soluble in ether and alcohol, slightly soluble in hot water, more freely soluble in an alcoholic solution. Fluorescein is of a dark-brown color, becoming green when added to water, and exhibiting a beautiful fluorescence.

Fluorescin is made by heating fluorescein with a solution of caustic soda and zinc dust. Ten grains of either substance may be dissolved in 1 ounce of water by the addition of 7½ grains of sodium bicarbonate.

Therapy.—Fluorescein and fluorescin are of service from their property of staining abraded corneal surfaces, by which means such lesions may be readily located. They have no effect in ulcers of the cornea or interstitial keratitis. These substances may be used also for the purpose of determining the permeability of stricture of the nasal duct. Forced into the canaliculus, if there is the least opening through the occlusion, some of the green solution will find its way into the nose.

GALEGA.

Dose, ʒi–iss.

Pharmacology and Therapy.—Galega officinalis and Galega apolinea (Leguminosæ), indigenous plants, stimulate the secretion of milk. A

watery extract possesses the properties and peculiar odor of the plant. In the daily dose of 1 drachm to 1½ drachms, galega excites, within a few days, a notable augmentation of the milk. According to M. de la Carrière,* the increase relates not only to the water, but to the globules also, as is shown by direct analysis and the gain in weight of the child.

GALIUM.—Cleavers, Bed-straw.

Pharmacology and Therapy.—The whole plant of Galium aparine (Rubiaceæ), a common indigenous herb, is used in domestic practice. Galium yields its virtues to water and alcohol, is bland to the taste, and devoid of bitterness or astringency. According to Dr. Eckfeldt, it is aperient, diuretic, and alterative. It may be used in the treatment of dropsy, incontinence of urine, jaundice, icterus neonatorum, and strumous manifestations associated with inactivity of liver and kidneys. Galium may be given in the form of an infusion or a fluid extract, the dose of which is 1 or 2 fluidrachms.

HAZELINE.

Dose, ♏x–f℥ij.

Pharmacology and Therapy.—This is the name of an excellent preparation made by Burroughs, Welcome & Co., of London, from the twigs of witch-hazel. (See pages 653–655.) The active principles of the plant are contained in hazeline, which is a useful embrocation in cases of contusion, sprain, and chronic rheumatism. It is applied upon absorbent cotton for the relief of hæmorrhoids and to allay the pain and smarting of burns, eczema, and erysipelas. Diluted with water, it may be beneficially injected into the rectum for internal hæmorrhoids. As a gargle or inhalation, it is useful in coryza, ozæna, and pharyngitis. A hazeline-cream is also prepared by the same firm, and is composed of hazeline, lanolin, and cold-cream. The combination makes an elegant soothing emollient and mild astringent ointment. It possesses decided penetrating power when used upon the integument, and is a very excellent antiseptic fatty substance. Hazeline-cream has a most agreeable action upon the skin, especially when rough or irritable, rendering the surface soft, smooth, and elastic. As a toilet-cream it is of service, especially in chapping or in irritation from the atmosphere. It is of benefit, also, in the treatment of alopecia or loss of hair, the hair often resuming its natural gloss and polish under its use, and the irritation of the sebaceous glands being overcome. This cream has been found of service in acne, rosacea, subacute cases of eczema, erythema, abrasions, and excoriations upon different parts of the body. Internally, hazeline, in drachm doses, is beneficial in varicose veins, internal hæmorrhoids, epistaxis, hæmoptysis, metrorrhagia, hæmorrhage from the bowels and kidneys.

* Le Progrès Médical, January 24, 1891.

HYDROCOTYLE.—Pennywort.

Pharmacology and Therapy.—The leaves of Hydrocotyle Asiatica, a plant growing in Southern Africa and India (Umbelliferæ), contain an oleaginous substance called Vellarine, supposed to be the active principle. An ounce of the dried leaves, made into an infusion, may be taken throughout the day. Hydrocotyle appears to exert an influence upon the genito-urinary apparatus. It has been given, with alleged advantage, in lupus, scrofuloderma, psoriasis, eczema, and lepra.

HYPNONE.—Phenyl-methyl-acetone.

Dose, ♏ v–x.

Pharmacology and Therapy.—Hypnone is a colorless fluid, insoluble in water or glycerin, and possesses an aromatic odor. It is preferably administered in capsules. It has some hypnotic power and is eliminated by the lungs and kidneys. In large doses it causes coma and paralysis of heart and respiration. Hypnone is thought to be especially adapted to the insomnia of alcoholism.

ILEX.—Holly.

Pharmacology.—The leaves of several American species of Ilex contain **Caffeine,** and may be used as substitutes for the Camellia thea. In the Southern United States, the Ilex cassine (Aquifoliaceæ) is used in this way to some extent, but the Brazilian holly, Ilex Paraguayensis, is much richer in caffeine, and is extensively used in South America, in recent infusion, where it is known as maté or Paraguay tea. The maté is the gourd in which the infusion is made by pouring upon the leaves successive quantities of boiling water. The following analysis will show the analogy and the slight differences between the Ilex and tea and coffee; it was made by Dr. T. Cranstoun Charles:—

	Caffeine. Percentage.	Tannic Acid. Percentage.	Ash. Percentage.
Tea, ...	3.1	22.7	5.8
Roasted coffee, ...	1.2	5.8	4.6
Maté, ...	0.79	21.9	4.1

Besides these constituents there are small amounts of volatile aromatic oils, empyreumatic products, etc., which modify the effects of each upon the system, and upon different individuals. In the main, however, the effects of maté are those of caffeine. (See page 491.)

Physiological Action and Therapy.—Charles found holly stimulant to the brain and also to the sympathetic system; the contractions of the muscular tissue of the heart and of the bladder and intestines were increased, and the whole muscular system stimulated to increased labor and wakefulness. Ilex augments the flow of urine and amount of urea and phosphoric acid. At present its therapeutic applications seem limited

to the treatment of headaches accompanied by constipation, especially when tea and coffee do not agree.*

ILLICIUM (U. S. P.).—**Illicium, Star Anise.**

Pharmacology and Physiological Action.—The Illicium anisatum (Magnoliaceæ) is a native of China and Siam; its fruit, which is officinal, contains a pleasant aromatic volatile oil resembling that of anise, and also some fixed oil. Two species, I. floridanum and I. parviflorum, are natives of this country, being found in Florida and adjacent States. The Japanese variety, Illicium religiosum, contains a much smaller quantity of the oil, besides a crystalline substance called *sikimin* or *shikimi*, which is poisonous; so that dangerous results have followed the substitution of the latter for the officinal, such as violent epileptiform convulsions with cyanosis, ending in death. Illicium is recognized by the pharmacopœia as one of the sources of the oil of anise; and, in fact, it is the chief source. Dr. E. Barral has isolated a poisonous glucoside from the kernel of Illicium parviflorum, which is not in the pericarp. The decoction of the seeds produces attacks of gastric irritation and vomiting, followed by paralysis, anæsthesia, convulsions, and death, if the dose be sufficiently large.†

Therapy.—The medicinal virtues are similar to those of anise and other carminatives. The crushed seeds are applied externally to allay the pain of earache, colic, rheumatism, etc. It also has some reputation in Germany in the treatment of bronchitis prepared as a tea; although this form of administration is not recommended.

IODANTIFEBRIN.

Dose, gr. ii–viij.

Pharmacology.—This substance results from the interaction of iodine chloride and antifebrin. It crystallizes in rhombic tablets, which are slightly soluble in cold water, alcohol, and ether; more freely soluble in hot alcohol and glacial acetic acid; is without odor or taste, and appears to pass through the organism unchanged.

IODANTIPYRIN.

Dose, gr. ss–ij.

Pharmacology.—This combination is prepared by a similar process to that which produces Iodantifebrin. Iodantipyrin crystallizes in colorless, lustrous, and prismatic needles, is without taste or special odor, is scarcely soluble in cold water or alcohol, but dissolves when these menstrua are warmed.

Physiological Action and Therapy.—Clinical experiments with both these bodies were carried on in the clinic of Professor von Jaksch, and

* British Medical Journal, July 26, 1890.

† Rev. Gén. de Clinique et de Thérapeutique, October 24, 1889.

the results have been published by Dr. Munzer. The antipyretic effects of iodantipyrin are identical with those of antipyrin and, in all probability, it is decomposed in the stomach into antipyrin and iodine. The reduction of temperature was accompanied by sweating, but was unattended by collapse or chills. An obstinate case of headache, apparently due to syphilis, was rapidly relieved by this substance, and in one case of acute rheumatism the pain disappeared within six hours after administration of the first dose.

No effects were derived from the use of iodantifebrin, which presumably passed through the alimentary canal unchanged, as neither iodine nor antifebrin could be detected in the urine.

IODOPHENIN.

Dose, gr. ss–ij.

Pharmacology and Physiological Action.—Iodophenin, an iodine derivative of phenacetin, is a chocolate-brown powder, which, upon recrystallization from glacial acetic acid, yields crystals of a steel-blue color. It is soluble in alcohol, ether, and chloroform, almost insoluble in water, but releases a large proportion of iodine when brought into contact with water. It is said to be very destructive to the staphylococcus aureus, but, according to Dr. W. Siebel, its physiological action depends upon the iodine which it liberates. It discolors, and, if left long in contact with the skin, produces irritation. Iodine poisoning is liable to result even from small doses of the compound, when given by the mouth.

KEFIR.

Pharmacology.—Kefir is a product of the fermentation of milk, brought to general professional notice by the writings of Russian physicians. It is prepared by the natives of the Caucasus by the addition of a ferment collected from a mountain-bush. The ferment consists of bacilli and yeast-cells, the latter alone being essential to the fermentation. Kefir is a pleasantly acid fluid, containing 8 parts of alcohol and 9 parts of lactic acid in 1000 parts.

Therapy.—Kefir is well tolerated by the stomach and has been employed with good results in the treatment of dyspepsia, gastric catarrh, gastric ulcer, anæmia, chlorosis, and scrofulosis. It is useful in maintaining nutrition in pulmonary tuberculosis and cancer of the stomach.

LOSOPHAN.—Tri-Iodo-Metacresol.

Pharmacology.—Losophan is the name given to the product resulting from the action of iodine on oxy-toluyl acid in the presence of an alkali. It contains 80 per cent. of iodine and occurs in the form of white needles which melt at 250.7° F. Losophan is slightly soluble in alcohol, insoluble

in water, readily soluble in ether, chloroform, benzol, and, at a temperature above 140° F., in fixed oils.

Physiological Action.—The effects of losophan must be closely observed, as it is a decided irritant.

Therapy.—The value of this substance as a topical remedy in diseases of the skin was investigated by Dr. Edmund Saalfeld, of Berlin. He employed it in the form of a 1-per-cent. solution in 3 parts of alcohol and 1 of water, and as a 1- to 3-per-cent. ointment. It was found of service in different forms of tinea, in chronic infiltrated eczema, squamous and fissured eczema. In prurigo and paræsthesia, losophan relieved itching. The application of a 1-per-cent. losophan ointment accomplished good results in certain cases of sycosis. It was useful, likewise, in acne and rosacea. In pediculosis and scabies it sometimes acted as a parasiticide. It is inapplicable to acute inflammatory diseases of the skin.

METHYLENE BLUE.—Tetramethylthionine Chloride.

Dose, gr. ii–v.

Pharmacology and Physiological Action.—Methylene blue communicates a blue color to the urine and fæces. Large doses will sometimes cause a scalding sensation in the bladder. It has an inhibitory influence upon various microbes. P. Ehrlich observed that the plasmodium of malaria and the red blood-corpuscles are strongly influenced by this dye.

Therapy.—Methylene blue has been found of service in malarial fevers by Guttmann, Ehrlich, Thayer, and others, though whether it is able to prevent recurrence has not yet been demonstrated. It was administered five times daily in doses of 1½ grains, the interval between the doses being dependent upon the form of the attack. Methylene blue has been serviceable, also, in trigeminal neuralgia, migraine, herpes zoster, and muscular rheumatism. In neuralgia it may be given in the daily amount of 15 grains without producing any ill effects.

MONESIA.

Dose, gr. x–xx.

Pharmacology.—The bark of Chrysophyllum glycyphlæum Casaretti (Sapotacæ), a tree of Brazil, and other varieties of the same species, contains, according to Henry and Payen, saponin, an allied body termed monesin, tannic acid, glycyrrhizin, wax, a crystalline fatty substance, etc.

Physiological Action and Therapy.—Monesia possesses expectorant properties free from unpleasant effects, and, by virtue of the tannin which it contains, is astringent. Formerly employed in medicine, monesia had fallen into disuse, but has been studied anew by Dr. P. G. Rozanoff, of Moscow. It was found of benefit in acute and chronic

bronchitis, pneumonia, subacute enteritis, and diarrhœa, given in a mixture of ½ to 1 drachm of aqueous extract of the bark to 6 ounces of water, a tablespoonful dose every second hour. Monesia was particularly valuable in co-existent catarrhal states of the respiratory and intestinal tracts.

MORRENIA.

Pharmacology.—Morrenia brachystephana (Asclepiadaceæ), a plant growing in the Argentine Republic and other South American countries, contains, according to the analyses of Señor Pedro N. Arata, fatty acid, resins, salts of lime, a glucoside, starch, albumin, gum, and a small quantity of a substance giving alkaloidal reactions. The alkaloid was obtained as a dark, reddish mass, of pleasant odor and a very bitter taste, soluble in chloroform, water, and amylic alcohol.

Therapy.—The physiological action of the plant has not been studied, but it has long enjoyed a local reputation as a galactagogue, and Del Arca and Sicardo report favorably as regards its efficacy. From the leaves or root an infusion is prepared in the strength of 3 ounces to the pint of water, the dose being a tablespoonful.

OLEANDER.

Preparation.

Tinctura Nerii. Dose, ♏x–xx.

Pharmacology.—Nerium oleander (Apocyanaceæ), an evergreen shrub, bearing handsome flowers, is a native of the country surrounding the Mediterranen, and well known in this country as a greenhouse or garden plant. A milky juice, of bitter taste, exudes when the young twigs are broken.

Physiological Action and Therapy.—The young twigs and the leaves of oleander are poisonous and have proved fatal to children and adults. A decoction of the leaves and bark is popularly used in the south of France as a lotion in various diseases of the skin. Dr. von Ohfele has recently advocated the use of oleander as a succedaneum to digitalis in cases where the latter fails or is ill-borne, and reports seventy-four cases in which it was found advantageous. Its principal effect is said to be the diminution of the rapidity of the pulse. The influence upon the circulation continued, in some instances, as long as two weeks after cessation of administration. Oleander was given in the form of a 10-per-cent. tincture, in doses of 20 drops three times a day.

PAMBOTANO.

Dose, ℥i–ij.

Pharmacology.—Pambotano, or Calliandra Houstoni, a Mexican shrub which grows to the height of three or five feet, has a local reputa-

tion, but was first brought prominently into notice by Dr. J. Valude. A chemical analysis of the plant by Dr. Villejean revealed the presence of a peculiar tannin which forms a dark-green precipitate with the perchloride of iron. The drug was administered by Dr. Valude in the dose of 2½ ounces to an adult, and 1 ounce to a child less than 12 years of age. A decoction or alcoholic elixir containing the dose was divided into four portions and taken within the twenty-four hours. It is advised that the liquid should be taken hot.

Therapy.—Pambotano has been almost exclusively used as a remedy in malarial fevers, as a substitute for quinine, in cases uninfluenced by the latter drug. Successful results were obtained in many cases by Valude, Bandera, Betances, Pellatan, and other observers, in Mexico, Central America, and Rome. A series of eight cases was treated by Dr. A. E. Roussel, of Philadelphia, by means of pambotano, with results which were decidedly encouraging, though not so brilliant as some of those reported from foreign sources. In two cases no improvement seemed to be produced, the failure being possibly due to rejection of the remedy by the stomach. Gastro-intestinal irritability is frequently caused by pambotano. Experiments were made by Dr. Roussel with pambotano in influenza, typhoid fever, and phthisis, but no influence could be detected upon the course of these maladies.

PENTAL.—Trimethyl-ethylene.

Dose, f℥ii–iij, by inhalation

Pharmacology.—Under the name of pental (because it contains five atoms of carbon) von Mering has introduced a compound made by heating tertiary amyl alcohol with oxalic acid. Pental is a colorless liquid, of low specific gravity and strong odor, is volatile and inflammable, boils at 100.4° F., and is insoluble in water. It mixes, in all proportions, with alcohol, chloroform, or ether. It does not decompose on exposure to light and air.

Physiological Action.—When inhaled, a loss of sensibility occurs within two or three minutes without entire abolition of consciousness. Profound narcosis may, however, be produced by means of pental. The return of consciousness is gradual. This agent is unirritant to the respiratory tract, and no ill effects upon the circulation or respiration have, as yet, been reported. As a rule, no excitement is caused, but in some instances laughter, hallucination, or transient spasm has occurred. Pental rarely gives rise to headache or vomiting. The conjunctival reflex is late in disappearing, and, except fixation of the eyes, no marked change takes place in the color or expression of the face. The pupils are sometimes widely dilated. Pental may be administered upon a handkerchief or by means of an inhaler, and 2 or 3 drachms usually suffice to produce anæsthesia.

Therapy.—Pental has been employed in the operations of dentistry and minor surgery. Hollænder and Weber have used it with satisfaction and success in the extraction of teeth, opening of abscesses, etc. Teeth may be painlessly drawn while the patient is partially conscious.

PIPERAZIN.

Dose, gr. v–viij.

Pharmacology.—Piperazin, a synthetical compound, is a piperidin in which the NH has replaced the CH_2 group. According to A. W. von Hoffmann, its chemical title is diethylendiamin. It occurs in the form of colorless, acicular crystals, of a pleasant taste and freely soluble in water. It is an admirable solvent for uric acid, with which it forms a neutral and very soluble salt. Experiments in the laboratory demonstrate the solvent action of a 1-per-cent. solution upon calculi, not only those composed of uric acid, but also those containing calcium phosphate, ammonium urate, etc. Piperazin urate is said to be seven times more soluble in water than lithium urate, and piperazin will render soluble twelve times as much uric acid as lithium carbonate. With hydrochloric acid it forms an easily soluble and crystallizable salt. Piperazin is a deliquescent body, and should not, therefore, be prescribed in the form of a pill or powder, but in aqueous solution.

Physiological Action.—Piperazin is non-toxic and unirritant to mucous membranes with which it comes in contact. It is without effect upon digestion, circulation, or respiration. This substance passes through the system unchanged, and speedily appears in the urine in a state of combination with uric acid. Piperazin has been recognized in the urine two hours after ingestion. Piperazin has no effect upon the acid reaction of that fluid, and does not increase its quantity. In some experiments upon themselves, Drs. Heubach and Kuh, after taking 37 grains during the day, experienced severe headache on the following morning, and upon one occasion vomiting occurred.

Therapy.—In accordance with its chemical properties, piperazin has been found an efficient remedy in gout and various manifestations of the uric-acid diathesis. Renal and vesical calculi, due to the deposit of uric acid, have been extruded under the influence of this remedy. Piperazin is likewise serviceable by dissolving the organic matter contained in the stones. Calculi in the bladder may also be attacked by the injection of a solution of piperazin into the viscus. A solution in alcohol and water has been applied locally to gouty joints and swellings, and aids the effect of the internal administration. A combination of piperazin and phenocoll is warmly recommended by Dr. Ritter for the relief of gout. Dr. Eccles has employed piperazin with advantage in chronic rheumatic arthritis, and Dr. Heubach relieved lumbago by the hypodermic injection of a 2-per-cent. solution, in quantity equal to 3 grains a day.

The injections gave rise to some pain, but did not cause abscesses or unpleasant after-effects. Dr. Disbrow, of Newark, N. J., saw alleviation of paræsthesia from the administration of this agent. Piperazin has proved of service in renal colic and hæmorrhage from the urinary passages.

Piperazin may be acceptably given in the form of an aërated water, 15 grains being dissolved in a quart, and the entire quantity taken during the day. It is also prescribed dissolved in distilled water and flavored with a little syrup of orange or other agreeable vehicle.

POLYTRICHIUM.—Haircap Moss.

Pharmacology.—Polytrichium juniperinum (Musci) is a mossy plant, growing abundantly throughout North America, in marshy places. A fluid extract may be used in the dose of 1 to 2 fluidrachms.

Physiological Action and Therapy.—The taste of polytrichium is somewhat pungent, but not acrid. Dr. Eckfeldt states that it has a certain nauseant effect, is alterative, and a diuretic of considerable power. He declares that the use of the drug for a few days causes an appreciable loss of weight, and that its physiological action merits a closer investigation than it has yet received. Dr. Eckfeldt has employed polytrichium with advantage in dropsical conditions due to disease of the liver or kidneys. Its effects are increased by combination with a diuretic or hydragogue cathartic.

STEARATES.

Pharmacology.—Stearic acid, prepared from suet, has been combined with copper, manganese, mercury, and zinc, forming powders which, in diseased conditions of the skin, can be used either in their own form or as ointments. Traces of other fatty acids are associated with the stearic acid.

Therapy.—The compound stearate of zinc is a serviceable dusting-powder in intertrigo, hyperidrosis, and acute vesicular eczema. It is useful in allaying itching. This compound is employed as a vehicle for many other drugs. Mixed with boric acid, it is beneficial in bromidrosis, paræsthesia, ulcers, and eczema. The compound stearate of zinc, mingled in various proportions with salicylic acid, is applicable to hyperidrosis, eczema rubrum, chancroids, and gangrenous wounds. The addition of tannic acid renders it advantageous in bed-sores and prolapsed bowel. With aristol it is serviceable in atrophic rhinitis and ozæna. The compound stearate of zinc with balsam of Peru may be employed by insufflation in tuberculous ulcers of the larynx. A union with chrysarobin is a good application in psoriasis; with cocaine it may be applied to the nasal passages in acute coryza and hay fever; with tar

it is advantageous in chronic eczema and psoriasis; with resorcin it is of utility in parasitic skin diseases and syphilitic ulcers. Other active compounds of stearates have been prepared and placed upon the market by McKesson & Robbins, of New York. The compound stearate of mercury is recommended for the relief of paræsthesia and as a substitute for other mercurial combinations. The compound stearate of manganese is considered as preferable to the purified oxide.

THILANIN.

Pharmacology and Therapy.—This name has been given to a combination of sulphur with lanolin. The compound, which contains 3 per cent. of sulphur, appears to differ from a mere mechanical mixture. It is as yet uncertain whether the sulphur is combined with the cholesterin or with fatty acids. Thilanin is an unctuous substance, of a yellowish-brown color and a sulphurous odor. It is devoid of irritant properties. In subacute, acute, and chronic eczema, the eczema of children, herpes, and sycosis, thilanin has proved of advantage. It can be mixed with aqueous or oleaginous fluids.

THIOSINAMIN.

Pharmacology and Physiological Action.—Thiosinamin, or allylsulphocarbamid, is made by heating together 2 parts of allyl-mustard-oil, 1 part of absolute alcohol, and 7 parts of solution of ammonia. Thiosinamin has been used by hypodermic injection, principally in lupus. It was the subject of a communication by Hans Hebra in August, 1892, to the International Congress of Dermatology and Syphilology. Injections of this substance are said to increase the quantity of urine excreted. They are productive of no injurious effect upon the kidneys. Thiosinamin promotes the absorption of exudations.

Therapy.—Subcutaneous injection of thiosinamin causes a local reaction of lupus, manifested by swelling of the diseased surface, continuing for four to six hours, gradually subsiding until, at the end of twenty-four hours, the skin has regained its former aspect. Constitutional symptoms do not occur. As a result of the operation, it is reported that lupous nodules retrocede, ulcers become clean, the elevated edges are leveled, and cicatrization takes place in a few weeks. Thiosinamin promotes resolution of enlarged lymphatic glands, especially in scrofulous or tuberculous subjects. It is without influence upon syphilitic lesions. The injections are said to have a decided effect upon corneal opacities.

TUMENOL.

Pharmacology and Therapy.—This is the name given to a substance discovered by Spiegel. Like ichthyol, to which it is allied, it is derived

from mineral oils, its title pointing to its origin from bitumen and oleum. The impure mother-substance occurs among the unsaturated hydrocarbons of the oils, and is separated by the addition of sulphuric acid, a process of sulphonation taking place, with the production of a compound consisting of tumenol-sulphon and tumenol-sulphonic acid. It is the latter of these substances which has been used clinically by Neisser in the form of powder, solution in sulphuric acid and alcohol, as an ointment, or plaster. It was found serviceable in acute eczema, burns, ulcers, and paræsthesia.

VANILLA (U. S. P.).—**Vanilla.**

Preparation.

Tinctura Vanillæ (U. S. P.).—Tincture of Vanilla (10 per cent.), used for flavoring.

Pharmacology.—Vanilla is the fruit of Vanilla planifolia (Orchidaceæ), a native of tropical America. The fruit appears in market in bundles of about fifty pods, 6 to 10 inches long, dark-colored, one-celled, containing a blackish pulp, in which are imbedded numerous very small black seeds, and some crystals of the characteristic principle **Vanillin** (about 2 per cent.), which is the methyl ether of pyrocatechuic aldehyde. Mexican vanilla is the best. The odorous active principle is soluble in alcohol; the pulp also contains fixed oil, sugar, resin, etc. Vanillin has been made synthetically.

Therapy.—Vanilla is used in flavoring troches and in making articles of food for the sick. It is added to chocolate during the preparation of this article for the market. It is an aromatic, and probably exerts some stimulating effects upon the human organism, which would make it serviceable in nervous affections. Some persons are more influenced by it than others. Vanilla is said to have aphrodisiac properties.

FORMULÆ FOR HYPODERMATIC USE.

ALCOHOL.

℞ Spir. frumenti, ... f℥ss.
(Dose: ♏xx–xxx.)

Or, ℞ Spir. vini gallici, ... f℥ss.
(Dose: ♏x–xxx.)
For syncope, hæmorrhage, heart-failure, shock, cholera, and snake-bites.

AMYL NITRITE.

℞ Amyl nitritis, ... fʒj.
Alcoholis, ... fʒiij.
(Dose: ♏x–xx.)
For angina pectoris, chloroform narcosis, strychnine poisoning, and surgical shock.

APOCODEINE.

℞ Apocodeinæ hydrochloratis, ... gr. ij.
Sodii chloridi, ... gr. x.
Aquæ eucalypti, ... f℥ss.
M. (Dose: ♏xxx = gr. $\frac{1}{4}$.)
For chronic bronchitis, croup, whooping-cough, and hæmoptysis.

APOMORPHINE.

℞ Apomorphinæ hydrochloratis, ... gr. ij.
Aquæ camphoræ, ... ♏c.
M. (Dose: ♏ii–viij = gr. $\frac{1}{25}$–$\frac{1}{6}$.)
For chronic bronchitis, bronchorrhœa, emphysema, hæmoptysis, chorea, whooping-cough, laryngismus stridulus, epilepsy, capillary bronchitis, and in narcotic poisoning.

AQUAPUNCTURE.

℞ Aquæ destillatæ, ... f℥ij.
(Dose: fʒss–j.)
For neuralgia, myalgia, and paralysis.

ARSENIC.

℞ Liquoris potassii arsenitis,
Aquæ destillatæ, ... āā fʒij.
(Dose: ♏v–xx.)

Or, ℞ Liquoris sodii arseniatis, ... fʒj.
(Dose: ♏v–xx.)

Or, ℞ Liquoris arsenii et hydrargyri iodidi, ... fʒij.
(Dose: ♏i–x.)
For chorea, neuralgia, epilepsy, lymphadenoma, enlarged spleen, psoriasis, and chronic eczema.

ATROPINE.

℞ Atropinæ sulphatis,	gr. 1/8.
Aquæ destillatæ,	f℥ss.

M. (Dose: ♏xxx = gr. 1/64.)

For sciatica, ovarian neuralgia, dysmenorrhœa, surgical shock, cholera collapse, pulmonary hæmorrhage, locomotor ataxia, mania, spasmodic asthma, seasickness, poisoning from aconite, muscarine, physostigmine or eserine, and opium.

CAFFEINE.

℞ Caffeinæ citratis,	gr. xvj.
Aquæ destillatæ,	f℥j.

M. (Dose: ♏xv–xxx = gr. ss–j.)

For neuralgia, hypochondriasis, asthma, organic heart disease, chronic Bright's disease, and uræmic coma.

CARBOLIC ACID.

℞ Acidi carbolici pur.,	gr. iv.
Aquæ destillatæ,	f℥ss.

M. (Dose: ♏xv–xxx = gr. 1/4–ss.)

For erysipelas, phthisis pulmonum, furunculus, carbunculus, enlarged lymphatic glands, bubo, and neuralgia.

CHLORAL HYDRATE.

℞ Chloral. hydratis,	℥ss.
Aquæ destillatæ,	f℥j.

M. (Dose: ♏x–xxx = gr. v–xv).

Chloral Hydrate and Morphine.

Or, ℞ Chloral. hydratis,	ʒij.
Morphinæ sulphatis,	gr. ij.
Aquæ destillatæ,	f℥j.

M. (Dose: ♏xxx = gr. viiss chloral hydrate; gr. 1/8 morphine sulphate.)

Chloral Hydrate, Morphine, and Atropine.

Or, ℞ Chloral. hydratis,	ʒij.
Morphinæ sulphatis,	gr. ij.
Atropinæ sulphatis,	gr. 1/8.
Aquæ destillatæ,	f℥j.

M. (Dose: ♏xxx = gr. viiss chloral hydrate; gr. 1/8 morphine sulphate; gr. 1/128 atropine sulphate.)

For obstinate vomiting or hiccough, collapse from cholera Asiatica or cholera nostras, spasmodic asthma, mania, convulsions, and neuralgia.

CHLOROFORM.

℞ Chloroformi purificat.,	f℥ss.

(Dose: ♏v–xv.)

Or, ℞ Spirit. chloroformi,	f℥ss.

(Dose: ♏x–xx.)

For sciatica, tic douloureux, and other neuralgiæ.

COCAINE.

℞ Cocainæ hydrochloratis,	gr. viij.
Aquæ eucalypti,	f℥j.

M. (Dose: ♏xxx = gr. ss.)

For producing local anæsthesia. Also in seasickness and vomiting of pregnancy

CODEINE.

℞ Codeinæ, ... gr. iv.
Aquæ destillatæ, ... f℥ss.

M. (Dose: ♏xxx = gr. ss.)

For neuralgia, hypochondria, delirium tremens, mania, and diabetes mellitus.

CODLIVER-OIL.

℞ Olei morrhuæ, ... f℥j.

(Dose: f℈i–iv.)

For scrofuloderma, paræsthesia, ecthyma, pemphigus, lichen, etc.

CONIINE.

℞ Coniinæ, ... f℈iii ♏xij.
Acidi acetici fort., ... f℈iii ♏xij.
Aquæ chloroformi, ... q. s. ad f℥ij.

M. (Dose: ♏j to begin with. ♏v contain ♏j of coniine.)

Or, ℞ Coniinæ hydrobromatis, ... gr. j.
Aquæ eucalypti, ... f℥ss.

M. (Dose: ♏x = gr. $\frac{1}{24}$.)

For pleurisy, pneumonia, angina pectoris, emphysema, asthma, acute mania, and tetanus.

COTOINE.

℞ Cotoinæ, ... gr. viij.
Sodii bicarbonatis, ... gr. xx.
Aquæ destillatæ, ... f℥ss.

M. (Dose: ♏x–xxx = gr. ⅓–j.)

For acute and chronic diarrhœa, diarrhœa of phthisis and typhoid fever. Also for night-sweats and Asiatic cholera.

CURARA.

℞ Curaræ, ... gr. j.
Aquæ destillatæ, ... f℈v.

M. (Dose: ♏xxx = $\frac{1}{10}$ grain.)

Or, ℞ Curarinæ sulphatis, ... gr. $\frac{1}{20}$.
Aquæ destillatæ, ... f℈v.

M. (Dose: ♏xxx = gr. $\frac{1}{200}$.)

For tetanus, hydrophobia, chorea, and epilepsy.

DATURINE.

℞ Daturinæ, ... gr. $\frac{1}{8}$.
Aquæ eucalypti, ... f℥j.

M. (Dose: ♏x–xx = gr. $\frac{1}{240}$–$\frac{1}{120}$.)

For neuralgia, asthma, epilepsy, and mania.

DIGITALIS.

℞ Tincturæ digitalis, ... f℈ij.

(Dose: ♏v–xv.)

Or, ℞ Tincturæ digitalis,
Spir. frumenti, ... āā f℈ij.

M. (Dose: ♏x–xxx.)

Or, ℞ Digitaline, ... gr. $\frac{1}{8}$.
Spir. vini gallici,
Aquæ destillatæ, ... āā fʒij.

M. (Dose: ♏x–xx = gr. $\frac{1}{120}$–$\frac{1}{60}$.)

For heart-failure, surgical shock, acute mania, hæmorrhage, and aconite poisoning.

DUBOISINE.

℞ Duboisinæ hydrochloratis, ... gr. $\frac{1}{8}$.
Aquæ destillatæ, ... f℥j.

M. (Dose ♏x–xx = gr. $\frac{1}{240}$–$\frac{1}{120}$.)

For asthma, locomotor ataxia, mania, sciatica, and dysmenorrhœa.

ERGOT.

℞ Extract. ergotæ fl., ... f℥ss.

(Dose: ♏xv–xxx.)

Or, ℞ Ergotin., ... gr. xxxij.
Acidi carbolici pur., ... ♏iij.
Aquæ destillatæ, ... f℥ss.

M. (Dose: ♏viiss–xv = gr. i–ij.)

For hæmoptysis, post-partum hæmorrhage, intestinal hæmorrhage of typhoid fever, purpura, uterine fibromata, varicose veins, varicocele, aneurism, enlarged spleen, enlarged prostate, leukæmia, and exophthalmic goitre.

ETHER.

℞ Ætheris loti, ... f℥ss.

(Dose: ♏xx–xxx.)

For heart-failure, surgical shock, syncope from hæmorrhage, snake-bites, typhoid pneumonia, variola, sciatica, biliary and renal colic, poisoning from aconite and veratrum viride.

GLONOIN (NITRO-GLYCERIN).

℞ Glonoini, ... ♏j.
Sp. vini rectificati, ... ♏ccc.

M. (Dose: ♏i–iv.)

For angina pectoris, asthma, epilepsy, tetanus, chloroform narcosis, and strychnine poisoning.

HOMATROPINE.

℞ Homatropinæ hydrobromatis, ... gr. $\frac{1}{8}$.
Aquæ destillatæ, ... f℥j.

M. (Dose: ♏x–xxx = gr. $\frac{1}{240}$–$\frac{1}{80}$.)

For night-sweats of phthisis, mania, and sciatica.

HYOSCINE.

℞ Hyoscinæ hydrobromatis, ... gr. $\frac{1}{8}$.
Aquæ destillatæ, ... fʒx.

M. (Dose: ♏xxx = gr. $\frac{1}{100}$.)

For chronic mania and dementia, insomnia, asthma, and sciatica.

HYOSCYAMINE.

℞ Hyoscyaminæ sulphatis, ... gr. $\frac{1}{8}$.
Aquæ eucalypti, ... f℥j.

M. (Dose: ♏xx–xxx = gr. $\frac{1}{120}$–$\frac{1}{80}$.)

For acute and chronic mania, chronic dementia, epilepsy, paralysis agitans, and chorea.

MERCURY.

℞ Hydrarg. chlorid. corros., ... gr. j.
Aquæ destillatæ, ... fʒij.

M. (Dose: ♏x = gr. $\frac{1}{12}$, once daily.)

Or, ℞ Hydrarg. chlorid. corros., ... gr. v.
Sodii chloridi, ... gr. x.
Aquæ destillatæ, ... f℥j.

M. (Dose: ♏x–xx = gr. $\frac{1}{10}$–$\frac{1}{5}$, every second or third day.)

Or, ℞ Hydrarg. chlorid. corros., ... gr. v.
Glycerini, ... fʒj.
Aquæ destillatæ, ... fʒvij.

M. (Dose: ♏xij = gr. $\frac{1}{8}$, every second day.)

Or, ℞ Hydrarg. chloridi mitis, ... gr. viij.
Olei olivæ, ... f℥ss.

M. (Dose: ♏xv–xxx = gr. ss–j, twice weekly.)

Or, ℞ Hydrarg. chloridi mitis, ... gr. xvj.
Petrolati fl., ... f℥ss.

M. (Dose: ♏xv–xxx = gr. i–ij, twice weekly.)

Or, ℞ Hydrarg. formamid., ... gr. ij.
Aquæ destillat., ... fʒvj.

M. (Dose: ♏xxx = gr. $\frac{1}{6}$.)

Or, ℞ Hydrargyri benzoatis, ... gr. iv.
Sodii chloridi, ... gr. ss.
Aquæ destillatæ, ... f℥iss.

M. (Dose: ♏xv = gr. $\frac{1}{12}$.)
For syphilis and psoriasis.

MORPHINE.

℞ Morphinæ sulphatis, ... gr. j.
Div. in chart. no. viij.
(Dose: One powder = gr. $\frac{1}{8}$, dissolved in 30 minims of water.)

Or, ℞ Morphinæ sulphatis, ... gr. ij.
Div. in chart. no. viij.
(Dose: One powder = gr. $\frac{1}{4}$, dissolved in 30 minims of water.)
For neuralgia, uræmic convulsions, asthma, angina pectoris, colic, and cancer.

MORPHINE AND ATROPINE.

℞ Atropinæ sulphatis, ... gr. ss.
Morphinæ sulphatis, ... gr. xx.

M. et div. in chart. no. cxx.

(One powder = atropine sulphate gr. $\frac{1}{240}$, morphine sulphate gr. $\frac{1}{6}$, to be dissolved in 30 minims of water.)

Or, ℞ Atropinæ sulphatis, ... gr. $\frac{1}{4}$.
Morphinæ sulphatis, ... gr. vj.
Acid. carbolici pur., ... gr. v.
Aquæ eucalypti, ... f℥j.

M. (Dose: ♏x = atropine sulphate gr. $\frac{1}{192}$, morphine sulphate gr. $\frac{1}{8}$.)

For insomnia, asthma, hiccough, myalgia, colic, herpes zoster, sciatica, angina pectoris, cancer, and surgical shock.

MUSCARINE.

℞ Muscarinæ nitratis, ... gr. xij.
Aquæ destillatæ, ... f℥j.

M. (Dose: ♏x–xxx = gr. ¼–¾.)
For night-sweats of phthisis and atropine poisoning.

NICOTINE.

℞ Nicotinæ, ... gr. ss.
Mucilag. acaciæ,
Aquæ destillatæ, ... āā f℥j.

M. (Dose: ♏x = ♏$\frac{1}{20}$ of nicotine.)
For tetanus.

OSMIC ACID.

℞ Acidi osmici, ... gr. j.
Aquæ destillatæ, ... f℥v.

M. (Dose: ♏x–xxx = gr. $\frac{1}{50}$–$\frac{1}{16}$.)
For sciatica.

PARACOTOINE.

℞ Paracotoini, ... gr. xxiv.
Glycerini,
Aquæ destillatæ, ... āā f℥ij.

M. (Dose: ♏x–xxx = gr. i–iij.)
For intestinal tuberculosis and other forms of diarrhœa.

Or, ℞ Pelletierinæ sulphatis, ... ℨj.
Aquæ destillatæ, ... f℥ij.

M. (Dose: ♏x = gr. v.)
For paralysis, tetanus, and hydrophobia.

PHYSOSTIGMINE.

℞ Physostigminæ hydrochloratis, ... gr. j.
Aquæ destillatæ, ... f℥v.

M. (Dose: ♏x–xxx = gr. $\frac{1}{50}$–$\frac{1}{16}$.)

Or, ℞ Physostigminæ salicylatis, ... gr. ⅛.
Aquæ destillatæ, ... f℥ss.

M. (Dose: ♏x–xxx = gr. $\frac{1}{120}$–$\frac{1}{40}$.)

Or, ℞ Extract. physostigmatis, ... gr. iv.
Aquæ destillatæ, ... f℥vj.

M. (Dose: ♏xxx = gr. ⅓.)
For tetanus, hydrophobia, and strychnine poisoning.

POTASSIUM IODIDE.

℞ Potassii iodidi, ... ℥ss.
Aquæ destillatæ, ... f℥j.

M. (Dose: ♏x–xxx = gr. v–xv.)
For syphilis, psoriasis, scrofula, lead poisoning, rheumatism, and gout.

PILOCARPINE.

℞ Pilocarpini hydrochloratis, ... gr. ij.

Div. in chart. no. xij.
(Dose: One or two powders = gr. ⅙–⅓, dissolved in 30 minims of distilled water.)
For hiccough, asthma, dropsy, uræmia, and chronic eczema.

Or, ℞ Pilocarpinæ nitratis, ... gr. xvj.
Aquæ eucalypti, ... f℥j.
M. (Dose: ♏v = gr. ⅙.)

QUININE.

℞ Quininæ sulphatis, ... ℈iv.
Acid. sulphurici dilut., ... f℥iiss.
Acid. carbolici pur., ... gr. ij.
Aquæ destillatæ, ... q. s. ad f℥ss.
M. (Dose: ♏x–xxx = gr. iii–x.)

Or, ℞ Quininæ hydrochloratis carbamidatæ, ... ℨij.
Div. in chart. no. xxiv.
(Dose: One or two powders = gr. v–x, in 30 minims of distilled water.)
For pernicious malarial fever, malarial cachexia, and sun-stroke.

RICINI OLEUM.

℞ Olei ricini,
Olei amygdalæ dulcis, ... āā f℥j.
M. (Dose: ℨi–iv.)
Useful in obstinate constipation.

STRYCHNINE.

℞ Strychninæ sulphatis, ... gr. j.
Aquæ eucalypti, ... f℥j.
M. (Dose: ♏x = gr. $\frac{1}{48}$.)

Or, ℞ Strychninæ sulphatis, ... gr. ⅓.
Acid. carbolici pur., ... gr. j.
Aquæ, ... f℥j.
M. (Dose: ♏xv–xxx = gr. $\frac{1}{96}$–$\frac{1}{48}$.)

For paralysis, progressive muscular atrophy, neuralgia, amaurosis, amblyopia, surgical shock, and aconite poisoning.

SPARTEINE.

℞ Spartein. sulphatis, ... gr. ij.
Aquæ eucalypti, ... f℥ss.
(Dose: ♏x–xx = gr. $\frac{1}{12}$–⅙.)
For cardiac and renal dropsy.

URETHAN.

℞ Urethan., ... ℨj.
Aquæ eucalypti, ... f℥j.
M. (Dose: fℨj = gr. viiss.)
For insomnia, tetanus, mania, and neuralgia.

TABLE OF DOSES.

Preparation.	Dose.
Absinthium	gr. xx—xl.
Abstractum aconiti	gr. ss—j.
belladonnæ	gr. 1-20—j.
conii	gr. i—iv.
digitalis	gr. ss—j.
hyoscyami	gr. ss—ij.
ignatiæ	gr. ¼—½.
jalapæ	gr. i—x.
nucis vomicæ	gr. ss—j.
podophylli	gr. ii—v.
senegæ	gr. v—x.
valerianæ	gr. v—xx.
Acetanilide	gr. v—xv.
Acetum lobeliæ	♏ x—f ʒj.
opii	♏ v—xx.
sanguinariæ	♏ xv—xl.
scillæ	♏ v—f ʒj.
Acidum arseniosum	gr. 1-30—1-12.
benzoicum	gr. x—xxx.
boricum	gr. v—xxx.
camphoricum	gr. viij—ʒj.
carbolicum	gr. ss—ij.
citricum	gr. x—ʒss.
gallicum	gr ii—x.
hydrobromicum dilutum	♏ x—f ʒiv.
hydrochloricum dilutum	♏ x—xxx.
hydrocyanicum dilutum	♏ i—v.
lacticum	♏ xx—f ʒss.
nitricum dilutum	♏ v—xx.
nitrohydrochloricum dilutum	♏ v—xxx.
phosphoricum dilutum	♏ ii—xx.
picricum	gr. ¼—ij.
salicylicum	gr. x—ʒj.
sulphuricum aromaticum	♏ x—xx.
dilutum	♏ v—xv.
sulphurosum	♏ v—f ʒj.
tannicum	gr. i—xx.
tartaricum	gr. v—xx.
Aconitina	gr. 1-300-1-250
Adhatoda justicia	gr. x.
Adonidin	gr. 1-20—1-5.
Æther aceticus	♏ x—f ʒj.
hydriodicus	♏ v—xx.
hydrobromicus	f ʒj.
Agaricin	gr. 1-12—j.
Ailanthus	gr. v—x.
Alnuin	gr. i—iij.
Alnus	gr. x—xl.
Aloe purificata	gr. i—xx.
Aloin	gr. i—xx.
Alumen	gr. i—xx.
ammonio-ferricum	gr. ii—xx.
exsiccatum	gr. i—v.
Aluminii hydras	gr. iii—xx.
Ambragrisea	gr. v—ʒj.
Ammonii benzoas	gr. ii—x.
boras	gr. iv.
bromidum	gr. x—xv,
carbonas	gr. ii—xx.
chloridum	gr. v—xx.
iodidum	gr. v—x.
phosphas	gr. iiss—xx.
valerianas	gr. ii—v
Amyl nitris	♏ ¼—j.
Amylene hydras	♏ x—xxx.
Amylum iodatum	gr. x—ʒj.
Antimonii et potassii tartras	gr. 1-40—j.
oxidum	gr. ii—iij.
Antimonium sulphuratum	gr i—iij.
Antypyrin	gr. v—xxx.
Apiolinum	♏ iii—vj.
Apocynum	gr. v—xx.
Apomorphinæ hydrochloras	gr. 1-16—¼.
Aqua ammoniæ	♏ ii—x.
amygdalæ amaræ	f ℥ss.
anisi	f ℥ss—j.
aurantii florum	f ℥ss—j.
camphoræ	f ʒi—iv.
chlori	f ʒi—v.
chloroformi	f ʒi—iv.
cinnamomi	f ℥ss—iv.
creasoti	f ʒss—iv.
fœniculi	f ʒij—f ℥j.
Aqua menthæ piperitæ	f ʒj—f ℥ij.
viridis	f ʒj—f ℥ij.
rosæ	f ℥ss—ij.
Arbutin	gr. ii—v.
Areca	♏ v—xx.
Argenti cyanidum	gr. 1-40—1-20.
iodidum	gr. ⅛—¼.
nitras	gr. 1-6—½.
oxidum	gr. ss—ij.
Asafœtida	gr. x.
Asclepidin	gr. i—v.
Asparagin	gr. i—ij.
Aspidium	ʒss—iss.
Atropina	gr. 1-200-1-60.
Atropinæ sulphas	gr. 1-200-1-60.
Auri et sodii chloridum	gr. 1-50—1-10.
Balsamum Canadense	♏ v—x.
Peruvianum	♏ v—xxx.
Tolutanum	gr. v—x.
Baptisin	gr. i—v.
Barii chloridum	gr. 1-20—½.
Benzanilide	gr. v—xv.
Benzinum	♏ x—xxx.
Benzo-naphthol	gr. v—ʒj.
Benzosol	gr. iv—xv.
Berberina	gr. ¼—v.
Berberinæ hydrochloras	gr. ¼—v.
Bismuthi citras	gr. i—v.
et ammoniæ citras	gr. i—v.
salicylas	gr. i—xx.
subcarbonas	gr. v—xx.
subnitras	gr. v—xx.
Bromoform	♏ v—x.
Bryonin	gr. 1-6—½.
Caffeina	gr. ii—x.
Caffeinæ citras	gr. i—v
sodio-benzoas	gr. ii—x.
sodio-salicylas	gr. ii—x.
Cajuputi oleum	♏ i—v.
Calcii bromidum	gr. x—xx.
carbonas precipitatus	gr. x—xl.
chloridum	gr. i—xx.
hypophosphis	gr. x—xx.
phosphas precipitatus	gr. x—xxx.
Calumba	gr. v—x.
Calx sulphurata	gr. ¼—ij.
Cambogia	gr. 1-10—iij.
Camphora	gr. i—ij.
monobromata	gr. i—v.
Cannabinæ tannas	gr. i—x.
Capsicum	gr. i—xx.
Carbo animalis purificatus	gr. x—ʒj.
Cardamomum	gr. v—xv.
Carduus benedictus	ʒi—v.
Carota	gr. xxx—ʒj.
Carum	gr. x—xxx.
Cascarilla	gr. ii—xx.
Cassia fistula	ʒj.
Catechu	gr. i—xxx.
Caulophyllum	gr. xv—xl.
Cedron	gr. i—ij.
Cerii oxalas	gr. i—x.
Chaulmoogra-oil	♏ v—xx.
Chelidonium	gr. x—xl.
Chenopodium	gr. x—xl.
Chinoidinum	gr. iii—xxx.
Chinolina	gr. viii—xvj.
Chinolinæ salicylas	gr. v—xxx.
Chirata	gr. xv—xxx.
Chloral	gr. ii—xx.
butylicum	gr. ii—xxx.
Chloralamid	gr. xxx—xlv.
Chloralose	gr. iii—vj.
Chloroformum purificatum	♏ x—xx.
Chrysarobinum	gr. ½—xx.
Cimicifuga	gr. xx—xxx.
Cinchonidinæ salicylas	gr. ii—x.
sulphas	gr. vi—xl.
Cinchonina	gr. v—xxx.
Cinchoninæ iodosulphas	gr. i—v.
sulphas	gr. v—xxx.

PREPARATION.	DOSE.
Cinnamomum	gr. x—xxx.
Cocainæ hydrochloras	gr. ¼—ij.
Codeina	gr. ¼—ij.
Colchicina	gr. 1-100-1-60.
Collinsonia Canadensis	gr. x—xl.
Colocynthis	gr. ii—v.
Confectio opii	gr. x—xx.
sennæ	ʒi—iij.
Coniina	♏ 1-10—j.
Coniinæ hydrobromas	gr. 1-12—j.
Convallamarinum	gr. ¼—ij.
Copaiba	♏ xx—fʒj.
Coriandrum	gr. v—xxx.
Coronilla	gr. v—xx.
Coronillin	gr. i—ix.
Coto	gr. v—xxx.
Cotoina	gr. ss—j.
Creasotum	♏ i—iij.
Creolinum	♏ ii—v.
Creta preparata	gr. x—xx.
Crocus	gr. x—xx.
Cubeba	gr. xx—ʒij.
Cupri acetas	gr. 1-10.
arsenis	gr. 1-40—j.
sulphas	gr. 1-6—ij.
Cuprum ammoniatum	gr. 1-6—j.
Curare	gr. 1-20—⅓.
Cypripedium	gr. xv—xxx.
Daturina	gr. 1-120.
Decoctum aloes compositum	f℥ss—ij.
apocyni	f℥i—ij.
azedarach	f℥ss.
cetrariæ	f℥i—iv.
cimicifugæ	fʒvj—f℥iss.
dioscoreæ	f℥i—iv.
euphorbiæ piluliferæ	f℥ij.
granati	f℥iv—vj.
hæmatoxyli	f℥i—ij.
quillaiæ	fʒi—ij.
decoctum rumicis	f℥i—iv.
sarsaparillæ compositum	f℥i—iv.
uvæ ursi	f℥ss—ij.
Delphinine	gr. 1-10 -1-8.
Digitalinum	gr. 1-60—1-30.
Digitalis	gr. ss—ij.
Dita	ʒi—iv.
Diuretin	gr. xv
Dracontium	gr. x—ʒj.
Duboisinæ hydrobromas	gr. 1-150-1-30.
sulphas	gr. 1-150-1-30.
Elaterinum	gr. 1-20—1-12.
Embelia ribes	ʒi—iv.
Emetina	gr. 1-120—¼.
Epigæa	ʒss—ij.
Ergota	gr. x—ʒj.
Ergotinum	gr. i—v.
Erigerontis oleum	♏ xx—xxx.
Eschscholtzia	gr. xxx.
Eucalypteol	gr. ss—iij.
Eupatorium	gr. xv—ʒj.
Euphorbia corollata	gr. xv—xx.
Euphorin	gr. iii—vj.
Europhen	gr. v—x.
Exalgine	gr. i—vj.
Extractum aconiti	gr. ¼—½.
aconiti fluidum	♏ 1-10—j.
æsculi hippocas tani fluidum	♏ xx—fʒj.
agarici	gr. iii—vj.
ailanthi glandulosæ fluidum	♏ x—fʒj.
alnus fluidum	♏ x—xl.
aloës aquosum	gr. ss—v
liquidum	♏ v—xl.
arnicæ radicis	gr. i—ij.
fluidum	♏ v—xx.
azedarach fluidum	fʒj.
baptisiæ	gr. i—ix.
belladonnæ alcoholicum	gr. 1-40—j.
fluidum	♏ 1-10—ij.
berberidis fluidum	♏ x—xxx.
brayeræ fluidum	♏ xx—fʒij.
bryoniæ fluidum	♏ v—xv.
buchu fluidum	♏ x—fʒj.
calami fluidum	♏ xv—fʒj.
calumbæ	gr. ss—ij.
fluidum	♏ xv—xxx.
camelliæ fluidum	♏ x—fʒj.
cannabis Indicæ	gr. ss.
fluidum	♏ i—xx.
capsici fluidum	♏ i—v.
cardamomi compositum fluidum	♏ xv.
Extractum cardui fluidum	♏ xv—fʒj.
cascaræ amargæ fluidum	fʒss—j.
cascarillæ fluidum	♏ ii—xx.
castaneæ fluidum	fʒi—ij.
caulophylli fluidum	♏ xv—xl.
chekan fluidum	fʒi—ij.
chelidonii	gr. x.
chimaphilæ fluidum	♏ xx—xl.
chinæ fluidum	fʒss—j.
chiratæ fluidum	♏ x—xxx.
cimicifugæ	gr. i—v.
fluidum	fʒss.
cinchonæ	gr. i—x.
fluidum	♏ x—fʒij.
cocculi fluidum	♏ i—ij.
cocillanæ fluidum	♏ x—xx.
coffeæ viridis fluidum	fʒss—ij.
colchici radicis	gr. ss—ij.
fluidum	♏ ii—iv.
seminis fluidum	♏ ii—v.
collinsoniæ fluidum	♏ x—fʒj.
colocynthidis	gr. ii—iij.
compositum	gr. iv—x.
conii alcoholicum	gr. ss—ij.
fluidum	♏ i—v.
convallariæ	gr. v—xx.
fluidum	fʒss—j.
coptidis fluidum	fʒss—j.
coriandri fluidum	♏ x—xxx.
cornus fluidum	fʒss—j.
Floridæ	gr. i—v.
corydalis fluidum	♏ xv—fʒj.
coto corticis fluidum	♏ xii—xxx.
cubebæ fluidum	♏ x—xxx.
cypripedii	gr. i—v.
fluidum	♏ x—xx.
damianæ	gr. v—xv.
fluidum	fʒss—iv.
digitalis	gr. ¼—½.
fluidum	♏ ss—ij.
dioscoreæ fluidum	♏ v—xxx.
droseræ fluidum	♏ v—xv.
duboisiæ	gr. 1-6—½.
fluidum	♏ x—xx.
dulcamaræ	♏ v—x.
fluidum	♏ xxx—fʒj.
embeliæ fluidum	fʒi—iv.
ephedræ fluidum	fʒi—ij.
ergotæ	gr. v—x.
fluidum	♏ x—fʒij.
eriodictyi	gr. iii—xv.
fluidum	♏ xv—xxx.
erythroxyli	gr. iii—xv.
fluidum	♏ x—fʒj.
eucalypti fluidum	♏ v—fʒj.
euonymi	gr. i—v.
eupatorii fluidum	♏ xxx—fʒj.
euphorbiæ piluliferæ	gr. i—ij.
fluidum	♏ xxx—fʒj.
fabianæ fluidum	♏ xv—xl.
frangulæ	gr. iii—viij.
fluidum	fʒss—j.
frankeniæ fluidum	♏ x—xv.
fraseræ fluidum	♏ xxx—fʒj.
galii fluidum	fʒi—ij.
gelsemii fluidum	♏ ii—x.
gentianæ	gr. iii—xv.
fluidum	♏ xxx—fʒj.
geranii	gr. i—v.
fluidum	♏ xxx—fʒj.
gei fluidum	♏ xx—fʒj.
gilleniæ (trifoliatæ) fluidum	♏ v—xxx.
glycyrrhizæ fluidum	♏ xx—fʒj.
purum	gr. v—ʒj.
gossypii radicis fluidum	fʒss—j.
granati fluidum	fʒi—ij.
grindeliæ	gr. i—v.
fluidum	♏ x—fʒj.
guaranæ fluidum	♏ x—fʒj.
hæmatoxyli	gr. v—x.
hamamelidis fluidum	♏ x—fʒj.
helianthemi fluidum	fʒi—ij.
helonias fluidum	♏ xx—xxx.
hemidesmi fluidum	fʒss—j.
hepaticæ fluidum	fʒss—iss.
hoang-nan fluidum	♏ v—xxx.
humuli	gr. v.
hydrangeæ fluidum	♏ xxx—fʒj.
hydrastis	gr. ii—v.
fluidum	♏ v—xxx.
hyoscyami	gr. i—ij.
alcoholicum	gr. 1-6—j.

Preparation.	Dose.
Extractum hyoscyami fluidum	♏ i—v.
ignatiæ	gr. 1-6—½.
fluidum	♏ i—ij.
ipecacuanhæ fluidum	♏ i—iij.
iridis	gr. ¼—j.
fluidum	♏ xxx—f ʒj.
jambolanum fluidum	♏ v—x.
juglandis	gr. v—xxx.
fluidum	f ʒi—ij.
juniperi fructus fluidum	f ʒss—iss.
kino liquidum	♏ xv—xxx.
krameriæ	gr. i—ix.
fluidum	♏ i—xx.
lactucarii fluidum	♏ x—f ʒj.
lappæ fluidum	♏ xv—f ʒj.
leonuri fluidum	f ʒi—ij.
leptandræ	gr. iii—x.
fluidum	f ʒss—j.
linderæ fluidum	♏ xxx—f ʒj.
lippiæ fluidum	♏ v—xxx.
lobeliæ fluidum	♏ i—x.
lupulini fluidum	♏ v—xv.
lycopi fluidum	f ʒi—iv.
magnoliæ fluidum	♏ xxx—f ʒj.
maidis stigmatorum fluidum	f ʒi—ij.
malti	f ʒi—iv.
diastasicum	f ʒj—f ℥ij.
manacæ fluidum	♏ v—xx.
mango fluidum	f ʒss—j.
manzanitæ fluidum	f ʒss—ij.
marrubri fluidum	f ʒi—ij.
matico	gr. ii—xij.
fluidum	♏ xx—f ʒij.
matricariæ fluidum	f ʒi—iij.
melissæ fluidum	f ʒi—ij.
menispermi fluidum	f ʒss—j.
methystici fluidum	♏ xv—f ʒss.
mitchellæ fluidum	f ʒss—j.
myricæ fluidum	f ʒss—j.
nucis vomicæ	gr. ¼—½.
fluidum	♏ i—v.
opii	gr. ¼—½.
origani fluidum	f ʒss—j.
orthosiphon fluidum	♏ xx—xxx.
pancreatis	gr. i—v.
pareiræ fluidum	f ʒss—j.
physostigmatis	gr. 1-6—iv.
phytolaccæ radicis fluidum	♏ v—f ʒj.
pilocarpi fluidum	♏ x—f ʒj.
pimentæ fluidum	♏ viii—xl.
pimpinellæ fluidum	♏ xv—f ʒss.
piscidiæ	gr. ii—x.
fluidum	f ʒss—ij.
plantago fluidum	♏ v—f ʒj.
podophylli	gr. ii—iv.
fluidum	♏ i—xxx.
polygonati fluidum	♏ v—xv.
polygoni fluidum	♏ x—f ʒj.
polytrichii fluidum	f ʒi—ij.
populi fluidum	f ʒss—j.
prinos fluidum	f ʒss—j.
pruni Virginianæ fluidum	♏ x—f ʒj.
pteleæ fluidum	♏ viii—xxx.
pulsatillæ fluidum	♏ i—v.
quassiæ	gr. i—v.
fluidum	♏ v—xx.
quebracho fluidum	f ʒss—j.
quercus albæ fluidum	f ʒss—j.
quillaiæ fluidum	♏ xv—f ʒss.
rhamni catharticæ fructus fluidum	f ʒi—iss.
purshianæ fluidum	♏ xv—f ʒj.
rhei	gr. ii—x.
fluidum	♏ x—f ʒj.
rhœados fluidum	♏ xxx-f ʒiss.
rhois aromaticæ fluidum	♏ v—f ʒiss.
glabræ fluidum	f ʒi—ij.
toxicodendri fluidum	♏ i—v.
rosæ fluidum	♏ v—f ʒj.
rubi fluidum	f ʒss.
rumicis fluidum	f ʒss—j.
sabal fluidum	f ʒss—ij.
sabbatiæ fluidum	f ʒss—j.
sabinæ fluidum	♏ v—xx.
salviæ fluidum	f ʒss—ij.
sanguinariæ fluidum	♏ v—xv.
santonicæ	gr. ii—viij.
fluidum	♏ viii—xxx.
sarsaparillæ	gr. v—xxx.
fluidum	f ʒss—ij.
sarsaparilla fluidum compositum	♏ vii—xxx.
scillæ fluidum	♏ i—v.
scutellariæ fluidum	f ʒss—j.
Extractum sedi acris fluidum	♏ xv—xxx.
senegæ fluidum	♏ x—xx.
sennæ	ʒi—iv.
fluidum	♏ xxx-f ʒiv.
deodoratum	f ʒi—iv.
serpentariæ fluidum	♏ x—xxx.
simulo fluidum	♏ xx—f ʒj.
solani paniculati fluidum	♏ x—xxx.
spigeliæ fluidum	f ʒi—ij.
stillingiæ fluidum	♏ x—f ʒj.
compositum	f ʒi—ij.
stramonii	gr. ¼—½.
fluidum	♏ i—v.
taraxaci	gr. x—xl.
fluidum	f ʒi—ij.
teucrii fluidum	f ʒi—ij.
thujæ fluidum	f ʒss—j.
tongæ fluidum	♏ xx—f ʒj.
trifolii fluidum	f ʒi—ij.
trillii fluidum	f ʒi—ij.
tritici fluidum	f ʒi—iv.
tussilago fluidum	f ʒi—ij.
uvæ ursi fluidum	f ʒss—j.
valerianæ fluidum	f ʒss—j.
veratri viridis fluidum	♏ i—xl.
viburni	gr. iii—x.
fluidum	♏ xv—f ʒj.
violæ fluidum	f ʒss—ij.
visci fluidum	♏ x—f ʒj.
xanthii fluidum	f ʒi—ij.
xanthoxyli fluidum	f ʒss—j.
zingiberis fluidum	♏ i—xx.
Fel bovis inspissatum	gr. v—viij.
purificatum	gr. iii—vj.
Fermentum	f ℥ss—j.
Ferri albuminas	gr. v—xxx.
arsenias	gr. 1-20—1-10.
carbonas saccharatus	gr. ii—x.
citras	gr. v—xv.
et ammoniæ citras	gr. iii—v.
sulphas	gr. iii—v.
tartras	gr. v—xx.
potassii tartras	gr. v—xv.
quininæ citras	gr. iii—v.
strychninæ citras	gr. i—iij.
ferrocyanidum	gr. iii—vj.
hypophosphis	gr. v—x.
iodidum saccharatum	gr. v—xx.
lactas	gr. ii—v.
oxalis	gr. ii—v.
phosphas	gr. v—x.
pyrophosphas	gr. ii—v.
sulphas	gr. i—v.
exsiccatus	gr. i—iij.
precipitatus	gr. i—ij.
valerianas	gr. i—iij.
Ferrum dialysatum	♏ x—xxx.
reductum	gr. i—v.
Fuchsin	gr. ¼—j.
Galega	ʒi—iss.
Gelsemium	gr. ii—xx.
Gentiana	gr. viii—xxx.
Geranium	gr. xv—ʒj.
Gillenia	gr. v—xxx.
Glycerinum	f ʒi—iv.
Glyceritum lactucarii	f ʒii—iij.
pepsini vitulini	♏ xxx—f ʒj.
Glycerolum pepsini	♏ ii—x.
Glycyrrhiza	gr. v—ʒss.
Granatum	ʒi—ij.
Guaiaci resina	gr. v—xv.
Gurjun-oil	♏ x—ʒij.
Hazeline	♏ x—f ʒij.
Helenin	gr. 1-6.
Helleborus	gr. iv—xv.
Helonias	gr. xv.
Heuchera	gr. xxx.
Homatropinæ hydrobromas	gr. 1-120-1-20.
Hydrargyri chloridum corrosivum	gr. 1-30—1-10.
mite	gr. 1-20—x.
cyanidum	gr. 1-100-1-82.
formamidatum	gr. 1-6.
iodidum rubrum	gr. 1-50—1-10.
viride	gr. ⅛.
oxidum rubrum	gr. 1-50—1-10.
salicylas	gr. 1-12—⅛.
subsulphas flavus	gr. ii—v.
tannas	gr. ss—j.
Hydrargyrum cum creta	gr. ss—x.

PREPARATION.	DOSE.
Cinnamomum	gr. x—xxx.
Cocainæ hydrochloras	gr. ¼—ij.
Codeina	gr. ¼—ij.
Colchicina	gr. 1-100-1-60.
Collinsonia Canadensis	gr. x—xl.
Colocynthis	gr. ii—v.
Confectio opii	gr. x—xx.
sennæ	ʒi—iij.
Coniina	♏ 1-10—j.
Coniinæ hydrobromas	gr. 1-12—j.
Convallamarinum	gr. ¼—ij.
Copaiba	♏ xx—f ʒj.
Coriandrum	gr. v—xxx.
Coronilla	gr. v—xx.
Coronillin	gr. i—ix.
Coto	gr. v—xxx.
Cotoina	gr. ss—j.
Creasotum	♏ i—iij.
Creolinum	♏ ii—v.
Creta preparata	gr. x—xx.
Crocus	gr. x—xx.
Cubeba	gr. xx—ʒij.
Cupri acetas	gr. 1-10.
arsenis	gr. 1-40—j.
sulphas	gr. 1-6—ij.
Cuprum ammoniatum	gr. 1-6—j.
Curare	gr. 1-20—⅕.
Cypripedium	gr. xv—xxx.
Daturina	gr. 1-120.
Decoctum aloes compositum	f ℥ss—ij.
apocyni	f ℥i—ij.
azedarach	f ℥ss.
cetrariæ	f ℥i—iv.
cimicifugæ	f ʒvj—f ℥iss.
dioscoreæ	f ℥i—iv.
euphorbiæ piluliferæ	f ℥ij.
granati	f ℥iv—vj.
hæmatoxyli	f ℥i—ij.
quillaiæ	f ʒi—ij.
decoctum rumicis	f ℥i—iv.
sarsaparillæ compositum	f ℥i—iv.
uvæ ursi	f ℥ss—ij.
Delphinine	gr. 1-10 -1-8.
Digitalinum	gr. 1-60—1-30.
Digitalis	gr. ss—ij.
Dita	ʒi—iv.
Diuretin	gr. xv
Dracontium	gr. x—ʒj.
Duboisinæ hydrobromas	gr. 1-150-1-30.
sulphas	gr. 1-150-1-30.
Elaterinum	gr. 1-20—1-12.
Embelia ribes	ʒi—iv.
Emetina	gr. 1-120—¼.
Epigæa	ʒss—ij.
Ergota	gr. x—ʒj.
Ergotinum	gr. i—v.
Erigerontis oleum	♏ xx—xxx.
Eschscholtzia	gr. xxx.
Eucalypteol	gr. ss—iij.
Eupatorium	gr. xv—ʒj.
Euphorbia corollata	gr. xv—xx.
Euphorin	gr. iii—vj.
Europhen	gr. v—x.
Exalgine	gr. i—vj.
Extractum aconiti	gr. ¼—½.
aconiti fluidum	♏ 1-10—j.
æsculi hippocas tani fluidum	♏ xx—f ʒj.
agarici	gr. iii—vj.
ailanthi glandulosæ fluidum	♏ x—f ʒj.
alnus fluidum	♏ x—xl.
aloës aquosum	gr. ss—v
liquidum	♏ v—xl.
arnicæ radicis	gr. i—ij.
fluidum	♏ v—xx.
azedarach fluidum	f ʒj.
baptisiæ	gr. i—ix.
belladonnæ alcoholicum	gr. 1-40—j.
fluidum	♏ 1-10—ij.
berberidis fluidum	♏ x—xxx.
brayeræ fluidum	♏ xx—f ʒij.
bryoniæ fluidum	♏ v—xv.
buchu fluidum	♏ x—f ʒj.
calami fluidum	♏ xv—f ʒj.
calumbæ	gr. ss—ij.
fluidum	♏ xv—xxx.
camelliæ fluidum	♏ x—f ʒj.
cannabis Indicæ	gr. ss.
fluidum	♏ i—xx.
capsici fluidum	♏ i—v.
cardamomi compositum fluidum	♏ xv.

PREPARATION.	DOSE.
Extractum cardui fluidum	♏ xv—f ʒj.
cascaræ amargæ fluidum	f ʒss—j.
cascarillæ fluidum	♏ ii—xx.
castaneæ fluidum	f ʒi—ij.
caulophylli fluidum	♏ xv—xl.
chekan fluidum	f ʒi—ij.
chelidonii	gr. x.
chimaphilæ fluidum	♏ xx—xl.
chinæ fluidum	f ʒss—j.
chiratæ fluidum	♏ x—xxx.
cimicifugæ	gr. i—v.
fluidum	f ʒss.
cinchonæ	gr. i—x.
fluidum	♏ x—f ʒij.
cocculi fluidum	♏ i—ij.
cocillanæ fluidum	♏ x—xx.
coffeæ viridis fluidum	f ʒss—ij.
colchici radicis	gr. ss—ij.
fluidum	♏ ii—iv.
seminis fluidum	♏ ii—v.
collinsoniæ fluidum	♏ x—f ʒj.
colocynthidis	gr. ii—iij.
compositum	gr. iv—x.
conii alcoholicum	gr. ss—ij.
fluidum	♏ i—v.
convallariæ	gr. v—xx.
fluidum	f ʒss—j.
coptidis fluidum	f ʒss—j.
coriandri fluidum	♏ x—xxx.
cornus fluidum	f ʒss—j.
Floridæ	gr. i—v.
corydalis fluidum	♏ xv—f ʒj.
coto corticis fluidum	♏ xii—xxx.
cubebæ fluidum	♏ x—xxx.
cypripedii	gr. i—v.
fluidum	♏ x—xx.
damianæ	gr. v—xv.
fluidum	f ʒss—iv.
digitalis	gr. ¼—½.
fluidum	♏ ss—ij.
dioscoreæ fluidum	♏ v—xxx.
droseræ fluidum	♏ v—xv.
duboisiæ	gr. 1-6—½.
fluidum	♏ x—xx.
dulcamaræ	♏ v—x.
fluidum	♏ xxx—f ʒj.
embeliæ fluidum	f ʒi—iv.
ephedræ fluidum	f ʒi—ij.
ergotæ	gr. v—x.
fluidum	♏ x—f ʒij.
eriodictyi	gr. iii—xv.
fluidum	♏ xv—xxx.
erythroxyli	gr. iii—xv.
fluidum	♏ x—f ʒj.
eucalypti fluidum	♏ v—f ʒj.
euonymi	gr. i—v.
eupatorii fluidum	♏ xxx—f ʒj.
euphorbiæ piluliferæ	gr. i—ij.
fluidum	♏ xxx—f ʒj.
fabianæ fluidum	♏ xv—xl.
frangulæ	gr. iii—viij.
fluidum	f ʒss—j.
frankeniæ fluidum	♏ x—xv.
fraseræ fluidum	♏ xxx—f ʒj.
galii fluidum	f ʒi—ij.
gelsemii fluidum	♏ ii—x.
gentianæ	gr. iii—xv.
fluidum	♏ xxx—f ʒj.
geranii	gr. i—v.
fluidum	♏ xxx—f ʒj.
gei fluidum	♏ xx—f ʒj.
gilleniæ (trifoliatæ) fluidum	♏ v—xxx.
glycyrrhizæ fluidum	♏ xx—f ʒj.
purum	gr. v—ʒj.
gossypii radicis fluidum	f ʒss—j.
granati fluidum	f ʒi—ij.
grindeliæ	gr. i—v.
fluidum	♏ x—f ʒj.
guaranæ fluidum	♏ x—f ʒj.
hæmatoxyli	gr. v—x.
hamamelidis fluidum	♏ x—f ʒj.
helianthemi fluidum	f ʒi—ij.
helonias fluidum	♏ xx—xxx.
hemidesmi fluidum	f ʒss—j.
hepaticæ fluidum	f ʒss—iss.
hoang-nan fluidum	♏ v—xxx.
humuli	gr. v.
hydrangeæ fluidum	♏ xxx—f ʒj.
hydrastis	gr. ii—v.
fluidum	♏ v—xxx.
hyoscyami	gr. i—ij.
alcoholicum	gr. 1-6—j.

PREPARATION.	DOSE.
Extractum hyoscyami fluidum	♏i—v.
ignatiæ	gr. 1-6—½.
fluidum	♏i—ij.
ipecacuanhæ fluidum	♏i—iij.
iridis	gr. ¼—j.
fluidum	♏xxx—f ʒj.
jambolanum fluidum	♏v—x.
juglandis	gr. v—xxx.
fluidum	f ʒi—ij.
juniperi fructus fluidum	f ʒss—iss.
kino liquidum	♏xv—xxx.
krameriæ	gr. i—ix.
fluidum	♏i—xx.
lactucarii fluidum	♏x—f ʒj.
lappæ fluidum	♏xv—f ʒj.
leonuri fluidum	f ʒi—ij.
leptandræ	gr. iii—x.
fluidum	f ʒss—j.
linderæ fluidum	♏xxx—f ʒj.
lippiæ fluidum	♏v—xxx.
lobeliæ fluidum	♏i—x.
lupulini fluidum	♏v—xv.
lycopi fluidum	f ʒi—iv.
magnoliæ fluidum	♏xxx—f ʒj.
maidis stigmatorum fluidum	f ʒi—ij.
malti	f ʒi—iv.
diastasicum	f ʒj—f ℥ij.
manacæ fluidum	♏v—xx.
mango fluidum	f ʒss—j.
manzanitæ fluidum	f ʒss—ij.
marrubri fluidum	f ʒi—ij.
matico	gr. ii—xij.
fluidum	♏xx—f ʒij.
matricariæ fluidum	f ʒi—iij.
melissæ fluidum	f ʒi—ij.
menispermi fluidum	f ʒss—j.
methystici fluidum	♏xv—f ʒss.
mitchellæ fluidum	f ʒss—j.
myricæ fluidum	f ʒss—j.
nucis vomicæ	gr. ¼—½.
fluidum	♏i—v.
opii	gr. ¼—½.
origani fluidum	f ʒss—j.
orthosiphon fluidum	♏xx—xxx.
pancreatis	gr. i—v.
pareiræ fluidum	f ʒss—j.
physostigmatis	gr. 1-6—iv.
phytolaccæ radicis fluidum	♏v—f ʒj.
pilocarpi fluidum	♏x—f ʒj.
pimentæ fluidum	♏viii—xl.
pimpinellæ fluidum	♏xv—f ʒss.
piscidiæ	gr. ii—x.
fluidum	f ʒss—ij.
plantago fluidum	♏v—f ʒj.
podophylli	gr. ii—iv.
fluidum	♏i—xxx.
polygonati fluidum	♏v—xv.
polygoni fluidum	♏x—f ʒj.
polytrichii fluidum	f ʒi—ij.
populi fluidum	f ʒss—j.
prinos fluidum	f ʒss—j.
pruni Virginianæ fluidum	♏x—f ʒj.
pteleæ fluidum	♏viii—xxx.
pulsatillæ fluidum	♏i—v.
quassiæ	gr. i—v.
fluidum	♏v—xx.
quebracho fluidum	f ʒss—j.
quercus albæ fluidum	f ʒss—j.
quillaiæ fluidum	♏xv—f ʒss.
rhamni catharticæ fructus fluidum	f ʒi—iss.
purshianæ fluidum	♏xv—f ʒj.
rhei	gr. ii—x.
fluidum	♏x—f ʒj.
rhœados fluidum	♏xxx-f ʒiss.
rhois aromaticæ fluidum	♏v—f ʒiss.
glabræ fluidum	f ʒi—ij.
toxicodendri fluidum	♏i—v.
rosæ fluidum	♏v—f ʒj.
rubi fluidum	f ʒss.
rumicis fluidum	f ʒss—j.
sabal fluidum	f ʒss—ij.
sabbatiæ fluidum	f ʒss—j.
sabinæ fluidum	♏v—xx.
salviæ fluidum	f ʒss—ij.
sanguinariæ fluidum	♏v—xv.
santonicæ	gr. ii—viij.
fluidum	♏viii—xxx.
sarsaparillæ	gr. v—xxx.
fluidum	f ʒss—ij.
sarsaparilla fluidum compositum	♏vii—xxx.
scillæ fluidum	♏i—v.
scutellariæ fluidum	f ʒss—j.

PREPARATION.	DOSE.
Extractum sedi acris fluidum	♏xv—xxx.
senegæ fluidum	♏x—xx.
sennæ	ʒi—iv.
fluidum	♏xxx-f ʒiv.
deodoratum	f ʒi—iv.
serpentariæ fluidum	♏x—xxx.
simulo fluidum	♏xx—f ʒj.
solani paniculati fluidum	♏x—xxx.
spigeliæ fluidum	f ʒi—ij.
stillingiæ fluidum	♏x—f ʒj.
compositum	f ʒi—ij.
stramonii	gr. ¼—⅙.
fluidum	♏i—v.
taraxaci	gr. x—xl.
fluidum	f ʒi—ij.
teucrii fluidum	f ʒi—ij.
thujæ fluidum	f ʒss—j.
tongæ fluidum	♏xx—f ʒj.
trifolii fluidum	f ʒi—ij.
trillii fluidum	f ʒi—ij.
tritici fluidum	f ʒi—iv.
tussilago fluidum	f ʒi—ij.
uvæ ursi fluidum	f ʒss—j.
valerianæ fluidum	f ʒss—j.
veratri viridis fluidum	♏i—xl.
viburni	gr. iii—x.
fluidum	♏xv—f ʒj.
violæ fluidum	f ʒss—ij.
visci fluidum	♏x—f ʒj.
xanthii fluidum	f ʒi—ij.
xanthoxyli fluidum	f ʒss—j.
zingiberis fluidum	♏i—xx.
Fel bovis inspissatum	gr. v—viij.
purificatum	gr. iii—vj.
Fermentum	f ℥ss—j.
Ferri albuminas	gr. v—xxx.
arsenias	gr. 1-20—1-10.
carbonas saccharatus	gr. ii—x.
citras	gr. v—xv.
et ammoniæ citras	gr. iii—v.
sulphas	gr. iii—v.
tartras	gr. v—xx.
potassii tartras	gr. v—xv.
quininæ citras	gr. iii—v.
strychninæ citras	gr. i—iij.
ferrocyanidum	gr. iii—vj.
hypophosphis	gr. v—x.
iodidum saccharatum	gr. v—xx.
lactas	gr. ii—v.
oxalis	gr. ii—v.
phosphas	gr. v—x.
pyrophosphas	gr. ii—v.
sulphas	gr. i—v.
exsiccatus	gr. i—iij.
precipitatus	gr. i—ij.
valerianas	gr. i—iij.
Ferrum dialysatum	♏x—xxx.
reductum	gr. i—v.
Fuchsin	gr. ¼—j.
Galega	ʒi—iss.
Gelsemium	gr. ii—xx.
Gentiana	gr. viii—xxx.
Geranium	gr. xv—ʒj.
Gillenia	gr. v—xxx.
Glycerinum	f ʒi—iv.
Glyceritum lactucarii	f ʒii—iij.
pepsini vitulini	♏xxx—f ʒj.
Glycerolum pepsini	♏ii—x.
Glycyrrhiza	gr. v—ʒss.
Granatum	ʒi—ij.
Guaiaci resina	gr. v—xv.
Gurjun-oil	♏x—ʒij.
Haseline	♏x—f ʒij.
Helenin	gr. 1-6.
Helleborus	gr. iv—xv.
Helonias	gr. xv.
Heuchera	gr. xxx.
Homatropinæ hydrobromas	gr. 1-120-1-20.
Hydrargyri chloridum corrosivum	gr. 1-30—1-10.
mite	gr. 1-20—x.
cyanidum	gr. 1-100-1-32.
formamidatum	gr. 1-6.
iodidum rubrum	gr. 1-50—1-10.
viride	gr. ⅙.
oxidum rubrum	gr. 1-50—1-10.
salicylas	gr. 1-12—⅙.
subsulphas flavus	gr. ii—v.
tannas	gr. ss—j.
Hydrargyrum cum creta	gr. ss—x.

PREPARATION.	DOSE.
Hydrastina	gr. ss—v.
Hydrastinæ hydrochloras	gr. ss—v.
Hydrocotyle	℥j.
Hyoscinæ hydrobromas	gr. 1-100.
Hyoscyaminæ sulphas	gr. 1-60—1-32.
Hyoscyamus	gr v—x.
Hypnal	♏xv—xxx.
Hypnone	♏v—x.
Hyssopus	gr. ii—v.
Ignatia	gr. i—ij.
Infusum asclepias	f℥i—ij.
brayeræ	f℥iv—viij.
buchu	f℥ij.
camelliæ	f℥ii—vj.
capsici	fʒii—℥ss.
caryophylli	f℥i—ij.
castaneæ	fʒii—iv.
cinchonæ	f℥ss—iij.
collinsoniæ	f℥i—iv.
convallariæ	f℥ss—ij.
digitalis	fʒi—iv.
eupatorii	f℥ii—iv.
gentianæ compositum	f℥ss—j.
humuli	f℥ii—v.
juniperi	f℥ii—iv.
morreniæ	f℥ss.
petroselini	f℥ss—ij.
pilocarpi	fʒii—f℥iv.
pruni Virginianæ	f℥i—iv.
quassiæ	fʒi—ij.
sassafras	fʒii—viij.
sennæ	f℥i—v.
compositum	f℥i—iiss.
taraxaci	f℥i—ij.
teucrii	f℥i—ij.
Inula	gr. xv—ʒj.
Inulin	gr. i—ij.
Iodantifebrin	gr. ii—viij.
Iodantipyrin	gr. ss—ij.
Iodoformum	gr. ii—v.
Iodol	gr. ¼—v.
Iodophenin	gr. ss—ij.
Iodum	gr. ss—j.
Ipecacuanha	gr. ss—x.
Iridin	gr. ss—iij.
Jalapa	gr. viii—xx.
Jambol	gr. v—x.
Juglans	ʒi—ij.
Kamala	ʒi—ij.
Kava-kava	♏xv—fʒss.
Kino	gr. x—xx.
Kola-nut	gr. v—ʒij.
Kosin	gr. v—xx.
Krameria	gr. v—xx.
Lactucarium	gr. x—xx.
Ledum	gr. xv—xxx.
Leptandra	gr. xx.
Liquor acidi arseniosi	♏i—x.
ammonii acetatis	fʒi—iv.
arsenii et hydrargyri iodidi	♏i—x.
calcis	f℥ss—ij.
ferri chloridi	♏ii—x.
citratis	♏x—xl.
et quininæ citratis	♏v—xv.
malatis	fʒss—ij.
nitratis	♏x—xx.
subsulphatis	♏ii—x.
hypophosphitum acidus	fʒi—iv.
iodi compositus	♏v—xx.
magnesii citratis	f℥iv—xvj.
pancreaticus	fʒi—iv.
pepsinæ	f℥ss.
phosphori	fʒj.
potassæ	♏x—xx.
potassii arsenitis	♏i—x.
citratis	f℥ss.
sodæ	♏v—x.
chloratæ	fʒss—j.
sodii arseniatis	♏iii—v.
Lithii benzoas	gr. v—xx.
bromidum	gr. v—xx.
carbonas	gr. v—xx.
citras	gr. v—xx.
guaiacas	gr. i—v.
iodidum	gr. i—v.
salicylas	gr. v—xx.
Lobelina	gr. ss—j.
Lupulinum	gr. v—xx.
Macrotin	gr. ss—ij.
Magnesia	ʒi—iv.
ponderosa	ʒss—iv.
Magnesii carbonas	ʒss—ij.
citras granulatis	ʒi—iv.
sulphas	ʒj—℥j.
sulphis	gr. xv—xxx.
Mangani oxidum nigrum	gr. ii—x.
sulphas	gr. ii—v.
Manna	℥j.
Massa copaibæ	gr. x—ʒss.
ferri carbonatis	gr. iii—v.
hydrargyri	gr. ss—xij.
Matico	gr. xxx—ʒj.
Menispermum	gr. v—xx.
Menthol	gr. i—v.
Methylene blue	gr. ii—v.
Mezereum	gr. x.
Mistura ammoniaci	fʒi—iv.
amygdalæ	fʒii—iv.
asafœtidæ	f℥ss—j.
cretæ	fʒi—iv.
chloroformi	fʒi—iv.
ferri composita	fʒii—iv.
et ammonii acetatis	fʒi—iv.
glycyrrhizæ composita	fʒj—℥ss.
magnesiæ et asafœtidæ	fʒss—iv.
potassii citratis	fʒii—iv.
rhei et sodæ	fʒj—℥j.
Monesia	gr. x—xx.
Morphina	gr. 1-10—½.
Morphinæ acetas	gr. 1-6—½.
hydrochloras	gr. 1-6—½.
sulphas	gr. 1-6—½.
Morrhuæ oleum	fʒj—℥ss.
Morrhuol	♏xv—xl.
Moschus	gr. v—viij.
Muscarina	gr. ⅙—ij.
Muscarinæ nitras	gr. 1-12—j.
Myrica	gr. xx—xxx.
Myristica	gr. v—xx.
Myrrha	gr. ii—xxx.
Myrtol	r. iv.
Naphthalinum	gr. i—x.
Naphthol-alpha	gr. ss—v.
beta	gr. ss—v.
Nicotina	♏1-30—1-10.
Oleoresina aspidii	fʒss—ij.
capsici	♏1-20—ij.
cubebæ	♏v—xxx.
lupulini	gr. ii—v.
piperis	♏¼—j.
Oleum amygdalæ amaræ	♏¼—j.
expressum	fʒij—℥ss.
anisi	♏v—x.
anthemidis	♏ii—viij.
camphoræ	♏i—iij.
cari	♏i—v.
caryophylli	♏i—vj.
chenopodii	♏v—xx.
cinnamomi	♏i—iij.
copaibæ	♏v—x.
coriandri	♏i—v.
cubebæ	♏v—xij.
eucalypti	♏iii—xx.
fœniculi	♏v—xv.
gaultheriæ	♏ii—xx
hedeomæ	♏ii—x.
juniperi	♏v—xx.
lavandulæ	♏iii—v.
florum	♏iii—v.
menthæ piperitæ	♏i—v.
viridis	♏ii—v.
myristicæ	♏i—v.
phosphoratum	♏i—v.
pimentæ	♏iii—v.
rosmarini	♏i—v.
sabinæ	♏ii—v.
sassafras	♏i—iv.
terebinthinæ	♏v—xv.
thymi	♏i—ij.
tiglii	♏¼—ij.
Opii pulvis	gr. ss—j.
Opium	gr. ¼—iij.
denarcotisatum	gr. ss—j.
Pambotano	℥i—ij.
Pancreatini pulvis	gr. v—x.
Pancreatinum	gr. i—v.
Papain	gr. i—v.

Preparation.	Dose.
Paraldehyde	♏xx—fʒij.
Pepo	℥i—ij.
Pepsinum in lamellis	gr. i—ij.
saccharatum	gr. x.
Petroselinum	gr. xxx—ʒij.
Phenacetin	gr. ii—viij.
Phenocollum hydrochloricum	gr. viii—xx.
Phosphorus	gr. 1-150-1-12.
Physostigminæ hydrobromas	gr. 1-60—1-20.
salicylas	gr. 1-64—1-20.
sulphas	gr. 1-60—1-20.
Phytolaccæ radicis pulvis	gr. i—v.
Pilocarpinæ hydrochloras	gr. 1-12—½.
Pilocarpus	gr. x—ʒj.
Pilulæ aloës	1 to 5 pills.
et asafœtidæ	1 to 5 "
et ferri	1 to 3 "
et mastiches	1 to 5 "
et myrrhæ	3 to 5 "
antimonii compositæ	1 to 2 "
asafœtidæ	1 to 4 "
catharticæ compositæ	1 to 3 "
ferri compositæ	2 to 4 "
iodidi	2 to 4 "
galbani compositæ	2 to 3 "
opii	1 pill.
phosphori	1 to 5 pills.
rhei	1 to 3 "
compositæ	1 to 3 "
Pimenta	gr. x—xl.
Piper	gr. ii—xv.
Piperazin	gr. v—viij.
Piperina	gr. ss—x.
Plumbi acetas	gr. i—iv.
iodidum	gr. 1-12—¼.
Podophyllotoxin	gr. 1-10—1-6.
Potassa sulphurata	gr. ii—viij.
Potassii acetas	gr. x—ʒj.
bicarbonas	gr. v—xxx.
bichromas	gr. 1-5.
bitartras	gr. xx—ʒiv.
bromidum	gr. x—ʒj.
carbonas	gr. ii—xx.
chloras	gr. ii—x.
citras	gr. x—xl.
cyanidum	gr. 1-12—j.
et sodii tartras	gr. xx—ʒiv.
ferrocyanidum	gr. x.
hypophosphis	gr. ii—xxx.
iodidum	gr. v—ʒj.
nitras	gr. ii—xx.
sulphas	gr. xx—ʒij.
sulphis	gr. v—ʒj.
tartras	gr. v—xx.
Prinos	ʒss.
Pulvis aloës et canellæ	gr. xx.
antimonialis	gr. i—x.
aromaticus	gr. v—xxx.
cretæ aromaticus cum opio	gr. x—xx.
compositus	gr. v—xxx.
extracti piscidiæ	gr. ii—x.
viburni	gr. iii—x.
glycyrrhizæ compositus	ʒi—ij.
ipecacuanhæ et opii	gr. ii—x.
jalapæ compositus	gr. x—ʒj.
morphinæ compositus	gr. v—xv.
pancreatini	gr. v—x.
rhei compositus	ʒss—j.
Quassia	gr. x—xxx.
Quillaiæ pulvis	gr. x—xxx.
Quinetum	gr. i—ʒj.
Quinidinæ sulphas	gr. v—xxx.
Quinina	gr. i—ʒj.
Quininæ bisulphas	gr. i—xv.
hydrobromas	gr. i—xx.
hydrochloras	gr. i—xv.
carbamidata	gr. i—x.
sulphas	gr. i—ʒj.
valerianas	gr. i—xx.
Resorcinum	gr. x—ʒj.
Rheum	gr. i—xx.
Ricini oleum	fʒj—f℥j.
Rutæ oleum	♏ii—v.
Sal bromalide	gr. v—viij.
Salicinum	gr. x—ʒij.
Salinaphthol	gr. iii—viij.
Salipyrin	gr. xv—xxx.
Salix	ʒj.
Salol	gr. v—ʒj.

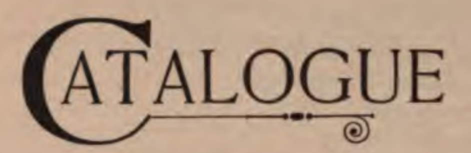
Preparation.	Dose.
Salophen	gr. v—xv.
Sanguinaria	gr. ii—xx.
Santali oleum	♏v—x.
Santonica	ʒss—j.
Santoninoxime	gr. iii—xij.
Santoninum	gr. i—iv.
Saponinum	gr. ss—ij.
Scammonium	gr. v—xv.
Scilla	gr. ii—iij.
Sedum acre	ʒss—j.
Senega	gr. x—xx.
Senegin	gr. ss—ij.
Senna	ʒi—iiss.
Serpentaria	gr. x—ʒj.
Sodii acetas	gr. xv—ʒj.
arsenias	gr. 1-12—½.
benzoas	gr. x—xx.
bicarbonas	gr. v—xl.
bisulphis	gr. x—ʒss.
boras	gr. x—xl.
bromidum	gr. xx—ʒj.
carbonas	gr. v—xx.
exsiccatus	gr. v—xx.
chloras	gr. ii—x.
chloridum	gr. v—xl.
hypophosphis	gr. x—xx.
hyposulphis	gr. x—xx.
iodidum	gr. x—xl.
nitras	ʒi—ij.
nitris	gr. iii—xx.
phosphas	gr. v—℥j.
pyrophosphas	gr. v—xl
salicylas	gr. v—ʒj.
santoninas	gr. ii—x.
sulphas	ʒss—j.
sulphis	gr. ss—ʒj.
sulphocarbolas	gr. ii—v.
Solidago	gr. xxx—ʒij.
Somnal	♏xx—fʒss.
Sparteinæ sulphas	gr. ss—ij.
Spigelia	ʒi—ij.
Spiritus ætheris compositus	fʒss—ij.
nitrosi	fʒi—ij.
ammoniæ	♏v—xv.
aromaticus	fʒss—ij.
anisi	fʒi—ij.
camphoræ	♏v—xx.
chloroformi	fʒss—j.
cinnamomi	fʒi—ij.
fœniculi	fʒss—j.
juniperi	f℥j—f℥j.
compositus	fʒii—iv.
lavandulæ	fʒss—j.
menthæ piperitæ	♏x—fʒj.
menthæ viridis	♏v—x.
myristicæ	fʒi—fij.
rosmarini	♏i—v.
Staphisagria	gr. i—iij.
Stramonii folia	gr. i—v.
Stramonii semen	gr. ss—ij.
Strontii bromidum	gr. x—xx.
iodidum	gr. x—xx.
lactas	gr. x—xx.
Strophanthin	gr. 1-100-1-60.
Strychnina	gr. 1-60—1-20.
Strychninæ sulphas	gr. 1-60—1-12.
Styrax	gr. v—xx.
Succus conii	fʒss—ij.
Sulphonal	gr. xv—xl.
Sulphur lotum	ʒss—℥ss.
præcipitatum	gr. xxx—ʒij.
sublimatum	gr. xx—ʒj.
Sulphuris iodidum	gr. ss—j.
Syrupus acidi hydriodici	♏xxx—f℥ss.
allii	♏x—fʒj.
cepæ	fʒi—iv.
amygdalæ	fʒii—iv.
calcii lactophosphatis	fʒi—ij.
calcis	fʒss—j.
ferri bromidi	♏x—fʒj.
iodidi	♏v—xxx.
quininæ et strychninæ phosphatum	fʒi—iv.
hypophosphitum	fʒss—ij.
compositus	f℥j—f℥j.
hypophosphitum cum ferro	f℥j—f℥j.
ipecacuanhæ	fʒi—ij.
krameriæ	fʒi—iv.
lactucarii	f℥j—f℥iss.
maidis stigmatorum	f℥ss—j.
papaveris	fʒss—f℥j.
phosphatum compositus	fʒi—ij.
picis liquidæ	fʒi—ij.

Preparation.	Dose.
Syrupus pruni Virginianæ	fʒi—iv.
rhamni catharticæ	fʒi—ij.
rhei	ʒj.
aromaticus	f℥ss.
rhœados	fʒi—ij.
rubi	fʒii—iv.
aromaticus	fʒi—iv.
sarsaparillæ compositus	fʒss—iv.
scillæ	♏x—fʒj.
compositus	♏x—fʒj.
senegæ	fʒi—ij.
sennæ	fʒi—iv.
tolutanus	f℥ss.
stillingiæ compositus	fʒj—f℥j.
trifolii compositus	fʒi—iv.
zingiberis	fʒi—iv.
Terebene	♏v—xx.
Terebinthina, Chian	gr. v—xx.
Terpene hydrate	gr. ii—x.
Terpinol	♏ii—v.
Tetronal	gr. v—ʒj.
Teucrium	gr. xx—xxx.
Thallin	gr. i—viij.
Thiol	gr. ⅙.
Thymacetin	gr. viiss.
Thymol	gr. ss—ij.
Tiglii oleum	♏¼—ij.
Tinctura aconiti	♏i—v.
agarici	♏xx—fʒj.
aloës	fʒss—ij.
et myrrhæ	fʒss—ij.
arnicæ florum	♏x—xxx.
radicis	♏v—x.
asafœtidæ	fʒss—j.
asclepias	fʒss—j.
belladonnæ	♏x—xx.
benzoini	fʒss.
composita	fʒss—ij.
berberidis	♏xx—fʒj.
boldi	♏v.
bryoniæ	fʒi—iv.
bursa pastoris	♏x—fʒiv.
cacti	♏i—v.
calendulæ	fʒss—j.
calumbæ	fʒi—ij.
cannabis	♏x—xx.
cantharidis	♏i—x.
capsici	♏v—fʒij.
cardamomi	fʒi—ij.
composita	fʒi—iv.
cascæ	♏v—x.
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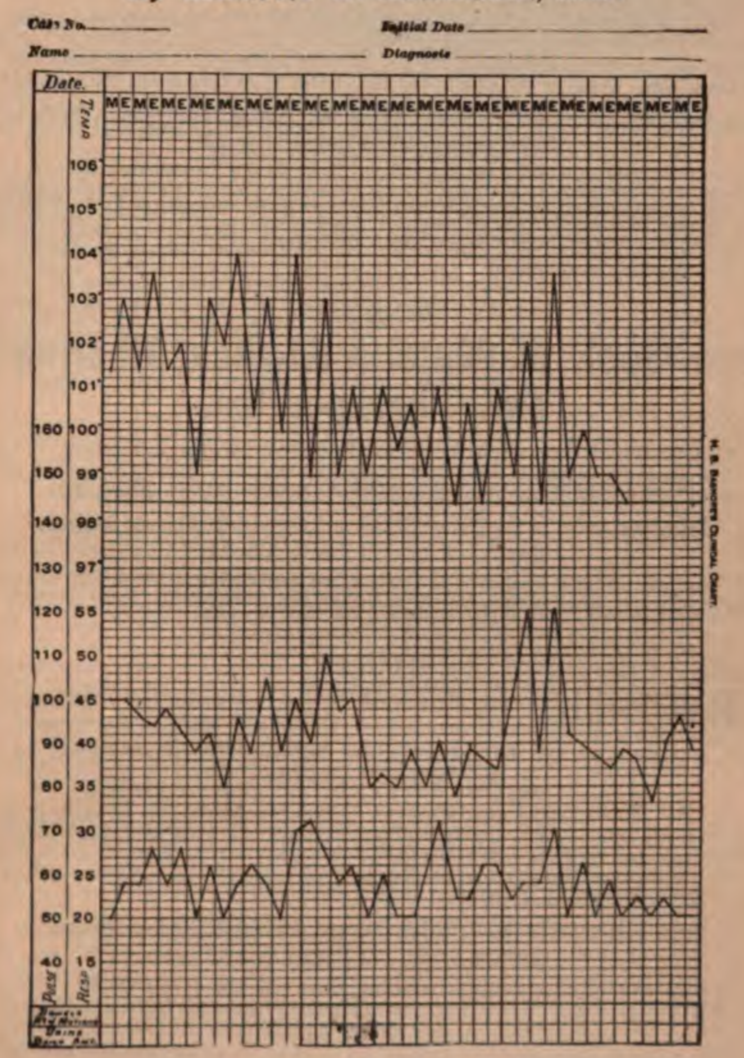
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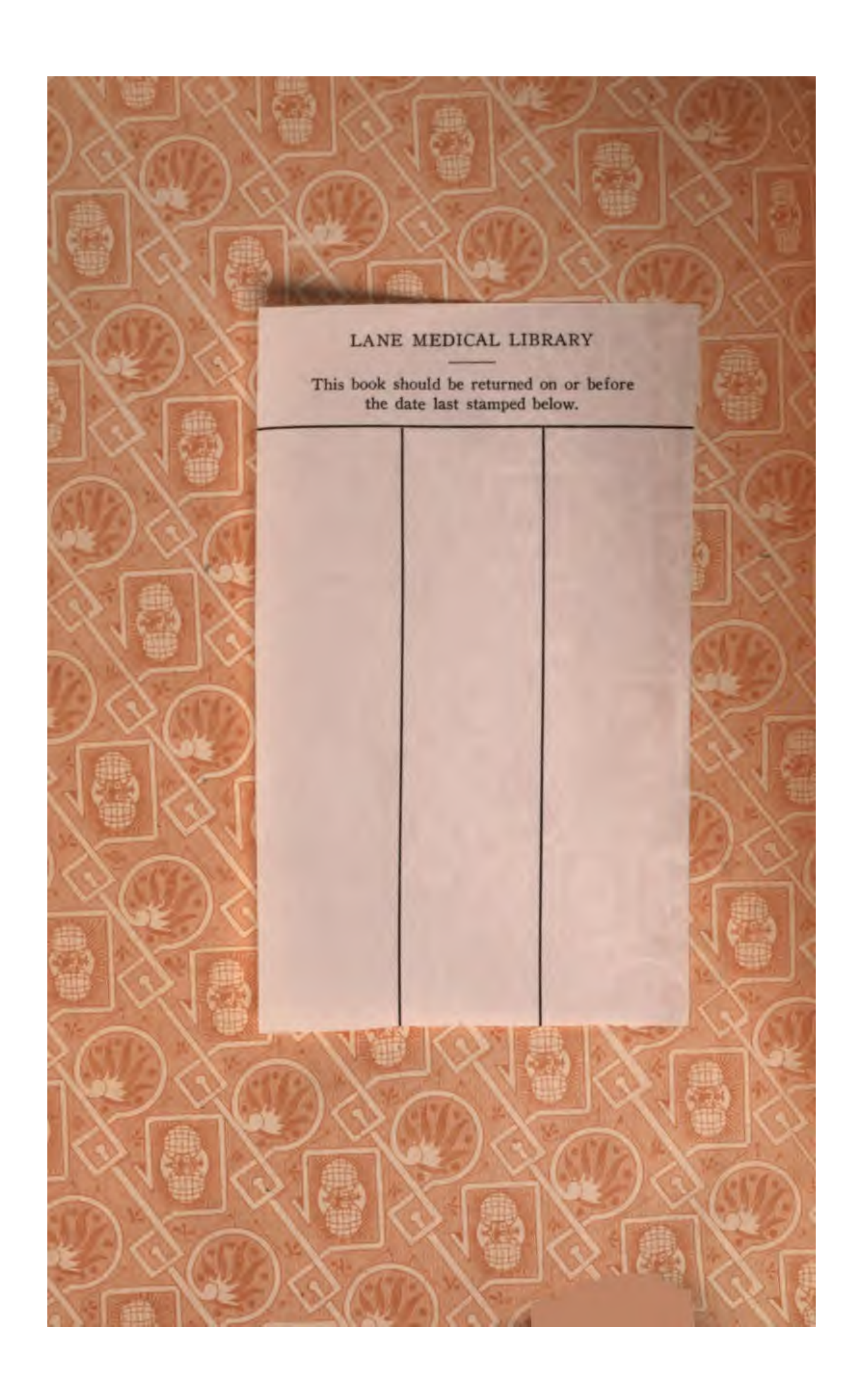
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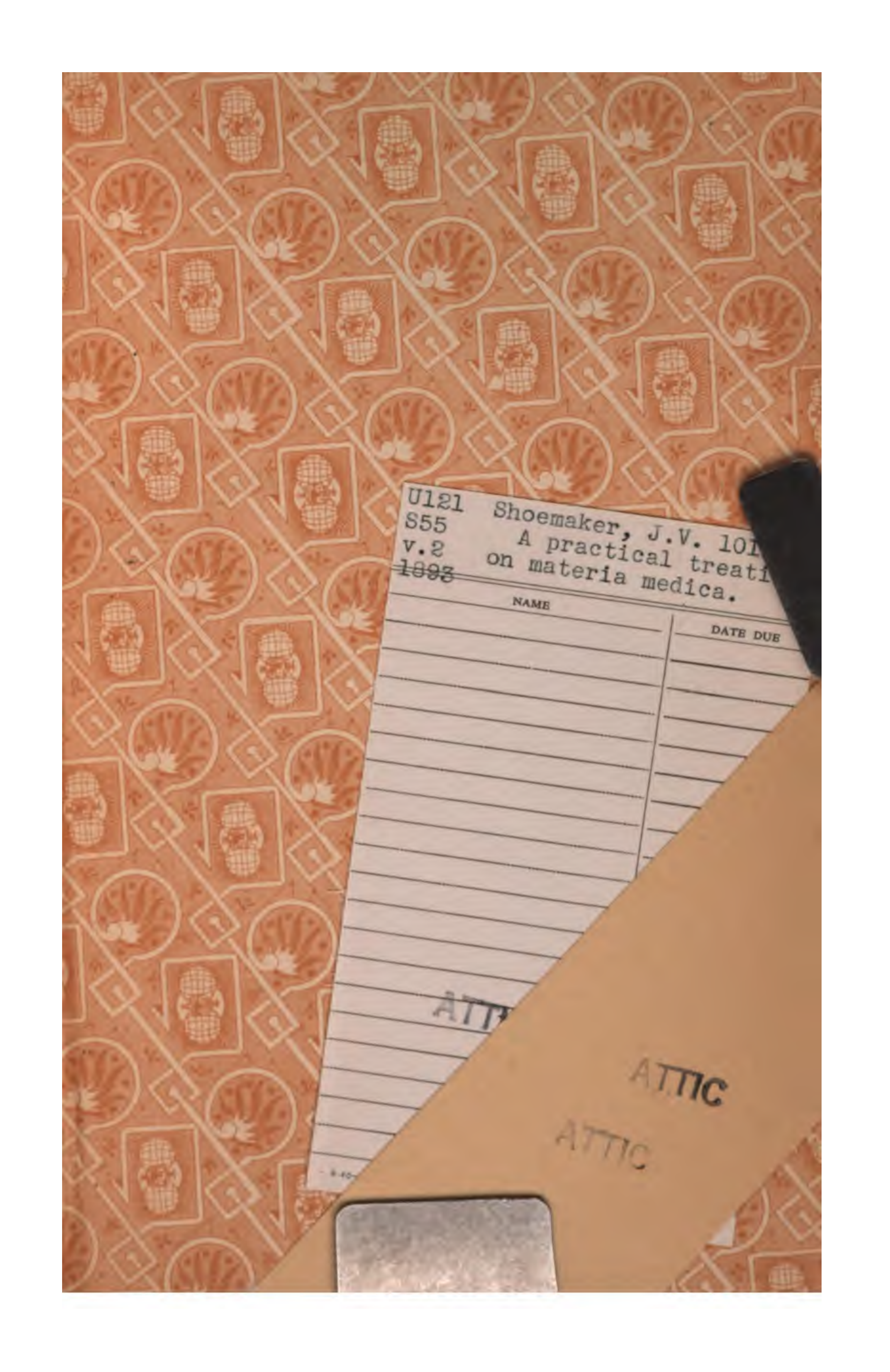
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